THE
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A Monthly Magazine of Practical Information and Useful Discussions

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The Wealth of India.

The object of this Monthly is to publish the views of experts on the various problems bearing on material progress, specially agriculture, commerce, industry, economics, co-operation, banking, insurance, popular, scientific and technical education, to digest the notable articles appearing in the leading magazines and periodicals and generally to serve as a record of practical information, and useful discussions. It is believed such a publication is indispensable to statesman, publicists, businessmen, students of economics and all others interested in the material and moral advancement of the country.

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Current Topics

BY ECONOMICUS.

Trade of India.

Mr. Noel-Paton's review of the trade of India for the year 1912-13 shows the strides that the imports and exports of this country have been steadily making. The value of the imports of merchandise was Rs. 138·57 crores in 1911-12 and this was a record; but in the year under review the imports rose to Rs. 161·01 crores, an advance of Rs. 22·44 crores or 16·2 per cent. on the previous year's figure. It is intersting to note that if the average of the imports for 1885-86 to 1889-90 is taken as 100, that for 1905-06 to 1909-10 rises to 189·4 and the figure for 1912-13 is 263·1. The year was equally good for Indian exports ; and for the fourth time in succession, the total was the largest on record. The exports amounted in 1912-13 to Rs. 241·16 crores as compared with Rs. 221·82 crores in 1911-12 and with an average of Rs. 203·98 crores in the three years ending 1911-12. Among the countries that contribute to the imports of India, the United Kingdom occupies the topmost position. It leads, as usual, with nearly 64 per cent. and Germany stands second with a share of only 6·4 per cent. Tariff reformers and Imperialists in England will please note these figures. Similarly with regard to the export trade of India. The lion's share goes to the United Kingdom which took 25·1 per cent. of our exports, Germany following with 10·1 per cent. It is obvious that England does not take more from us because she does not want more.

Among the principal articles exported, rice led in 1912-13 with a value of Rs. 32·55 crores. Then came raw cotton with Rs. 28 crores; raw jute followed with 27 crores and jute manufactures with 22·87 crores. Seeds were exported to the value of 22-75 crores; the value of wheat and wheat-flour was 18·77 crores, of hides and skins 16·37 crores and of tea 13·29 crores. Among imports, on the average of the last three years, cotton goods represent 47·6 per cent. of the total value of manufactured articles. The aggregate value of the imports into India of cotton yarn and of woven and other cotton goods in 1912-13 was Rs. 56·37 crores as against Rs. 45·77 crores in 1911-12 and Rs. 41·17 crores, the average of previous three years. Sugar retains its position as the second article in order of importance in any class of imports. The imports of sugar advanced in value by Rs. 2·37 crores, the increase amounting to 33·1 per cent. in quantity and 21·2 per cent. in value. The total value of the imports of tobacco rose to Rs. 69·39 lakhs, of which 76·1 per cent. is represented by cigarettes. Since 1907 there has been a progessive decline in the imports of machinery, the value going down from Rs. 6-86 crores to Rs. 1·56 crores. But in 1912-13 the lee-way of the last two years has been more than made up, and a recovery has been initiated with a comparable total of Rs. 5·41 crores, which is short of the record by 21 per cent. The total amounts to Rs. 5.85 crores which marks an increase of 28·3 per cent. on the corresponding figures for 1911-12.

Cotton-Growing in India.

Cotton manufacturers in Europe have evinced great anxiety latterly to broaden the basis of cotton cultivation throughout the world and thereby to ensure an adequate supply of raw cotton and maintain a steady price level. Their eyes have been specially directed to India and their solicitude for the agricultural progress of this country has been much in evidence, of late. Since 1910 deputations from the International Cotton Federation have been waiting, every year, upon the Secretary of State for India to impress upon him the necessity of extending and improving the cultivation of cotton in this country. Lord Morley, when he was at the India Office had drawn the attention of the deputation that had waited upon him in 1910 to the progress that was already being made and to the undesirability of pushing on the cultivation of cotton at the expense of other important crops. Last year, Lord Crewe also referred to this aspect of the question in replying to the deputation of the International Cotton Federation and gave them to understand that the Government had to consider the subject of cotton cultivation in relation to its probable effects upon the production of food-grains which is so vital to the people of this country. The deputation from the International Cotton Federation which recently waited upon Lord Crewe, was headed by Sir Charles Macara and was accompanied by several Lancashire members of the House of Commons. Its chief object, of course, was to urge the importance of encoraging the growth of cotton in India. Sir Charles observed that the Indian crop this year would be worth fifty millions and that some improvement, though not so much as could be wished, was apparent in its quality. Mr. S. M. Johnson submitted that agriculture in India could not be sufficiently developed unless timely and adequate financial assistance were forthcoming. The foreign delegates pointed out that increasing quantities of Indian cotton were used on the contiment, Germany taking six times more than England. We are glad Lord Crewe did not mince matters and told the deputation that it was unreasonable to ask the Indian cultivator to displace other crops by cotton unless he could be definitely assured that cotton would be more lucrative than the crop which it displaced. In fact, Indian agriculture is a subject which has to be considered, in the main, from the point of view of Indian interests. The indigenous cotton crop has indeed proved profitable, but the effects wnich an extension of cotton cultivation may have upon the production of food-grains and upon prices, must be seriously considered before any deliberate

measures are taken. The deputation had urged that the fraudulent practice of damping cotton in press and ginnery be made a criminal offence and Lord Crew replied that if the trade considered that it was helpless to prevent this by trade regulations, he would again impress on the Government of India the possibility of undertaking some form of penal legislation which might intimidate some of the parties to the fraud. Improvement of agriculture is surely one of the most serious and urgent problems the Government of India have to tackle, and it cannot be said that they have been able to make much progress in solving it. The International Cotton Federation looks at the question from its own point of view. It does not understand properly the situation of the Indian cultivator and perhaps does not much care to understand it provided its particular object is gained, though Mr. Arno Schmidt, its representative, has visited India and studied the question on the spot. What is required is a more comprehensive view of the whole question and action on a more liberal and extensive scale. The Cotton Federation can assist us by rousing Government from time to time to a sense of its duty in the matter of agricultural improvement, though that improvem nt cannot be beneficial if one-sided and hasty.

The Proposed Commercial Congress.

The suggestion the Hon'ble Sir Fazulbhoy Currimbhoy of Bombay has made in the press in connection with a Congress of Indian Commerce and Industry is a highly valuable one, and we hope it will attract the public attention it deserves. During the last few years, the people of India have been earnestly considering the question of industrial and commercial development of the country and the Indian Industrial Conference is a concrete illustration of the interest evoked in the subject. In spite of the rapid strides which the import and export trade of India is marching forward, it is common knowledge that the advance made by the purely indigenous industries is not very satisfactory. Public enthusiasm, genuine and widespread, which, only a few years ago, gave such prominence to the question of the growth of national industries, has already waned though it has left behind some valuable experience and tangible work done to stimulate industrial progress. Sir Fazulbhoy recognizes this fact and thinks the time is now come when an earnest effort should be made to consolidate all these activities in a common well-thought out and well-directed movement. He, therefore, suggests to Indian commercial men and others interested in trade and industry the idea of holding a Congress of commerce and industry, whose sittings may at first be limited to once in two or three years and to which representative of all interests affecting the economic prosperity of India will be welcome. In course of time, it is thought the Congress may absorb the Industrial Conference which is now held in connection with the Indian National Congress. Sir Fazulbhoy feels that a congress such as he proposes will direct opinion in sound and practicable channels, and will, moreover, be a useful medium of communication between the Indian commercial community and the Government of India. The Industrial Conference, it must be gratefully acknowledged, has, so far, done much useful work and by means of its publications and otherwise served the cause it has taken up. Its life and soul, the Hon'ble Mr. Mudholkar, deserves the best thanks of the public for the strenuous efforts he has been making to maintain the usefulness of the institution. The Conference, however, labours under a number of disadvantages. It suffers from a want of regular supply of adequate funds in the absence of which nothing solid can be done. Its sittings are held during the session of the National Congress and though they are calculated to benefit by the concourse of a large number of people who take interest in the industrial regeneration of their country, the Conference cannot be expected to attain a healthy growth in the cramping conditions imposed upon it by the naturally predominant influence of the elder body during the congress week. The proceedings of the conference

are hurried and it tends to become, more or less, a public demonstration and not an assembly of cool-headed and shrewd men of commerce and industry. The Conference may certainly be replaced by a congress of the type proposed by Sir Fazulbhoy. But the success even of that organization will depend upon the active interest which commercial men take in its work. If the sessions of the congress are held at Bombay, Calcutta and Madras, they will certainly prove successful. "In view of the expected important developments in the commercial and fiscal policy of Great Britain in relation to its Colonies and Dependencies, the importance of the existence of a recognized organ of Indian commercial opinion cannot be exaggerated," observes Sir Fazulbhoy and we thoroughly agree with him. We also agree that such a body will speak with authority and emphasis on behalf of Indian interests in the Councils of the Empire, and its representations must carry weight. If the proposed congress of commerce and industry is properly constituted and secures the support of business men and others interested in the economic progress of the country, its future is assured. It ought not to be the only business of the commercial congress to focus public opinion and represent it to Government. This the Indian Chambers of Commerce may well be expected to do. The congress will have to study the general economic situation of the country and initiate measures. Its committees will take up different questions and experts will investigate them and suggest solutions. The proposed congress will be able to do this better than the existing Industrial Conference. It will not, however, succeed unless our leading merchants and businessmen are keen about the work of the congress. Our past experience in this matter is not very encouraging and hence one cannot be sanguine about the success of the proposed organization. The idea is, however, one which our public spirited men, and especially our businessmen, ought to take up in right earnest. Such an organization should not be run by men who are not in direct touch with industry and commerce. The success of the projected scheme depends upon the response it receives at the hands of our leading business men in the different provinces.

Indian Railways.

That the railways in India have now become a source of revenue instead of a burden upon the shoulders of the tax-payers, is a fact on which the public and the Government have reason to congratulate themselves. Sir G. F. Wilson, it may be re-collected, however had warned the public against over-rating the remunerative character of this source of national income. Though this caution is thoroughly justified, it is a pleasure to know that the financial results of the railways to the State during the calendar year 1912, were satisfactory. From the administration report on the Railways in India recently issued, we see that during the last year, after meeting, in addition to the expenses of working, all charges for interest on capital outlay by the State and on capital raised by the Companies, also annuity payments connected with the purchase of railways by the State, the State realised a net gain of Rs. 823·33 lakhs. The peculiar difficulty with which Railway Administrations had to grapple during the year was the inability of railways to deal promptly with all the traffic offered to them. This difficulty was specially acute in connection with the coal traffic. The report states that the carrying capacity of railways has considerably in creased though they could not cope with the unusually heavy traffic which swelled during the trade boom which outstripped the transport capacities of the railways. For the current official year, the largest programme grant which has yet been attained for Indian railways, amounting to 18 crores of rupees, has been sanctioned, and the policy of improving the carrying capacity of open lines is being vigorously pushed on. The question of railway congestion engaged the special attention of the Railway Board and the latter hope that a marked and progressive improvement will be visible in each successive year as it

was during the year under report. A noteworthy feature of the year was the increasing attention taken in the promotion of Branch railways. One notices with satisfaction that the practice of using local manufactures for railway purposes was continued and that it has been decided that the Government Laboratory established at Sakchi, near Kalimati primarily with the object of testing on the spot the steel rails manufactuned at the Tata Iron and Steel Works for State worked railways, should undertake to test other products from the same works for these railways and rails, other steel sections and pigiron, etc, for other Government Departments as well as for Companies' Railways.

A Novel Currency System for India.

The panacea for the currency evils in India suggested by Mr. Mark B, F. Major in an address he delivered at the Caxton Hall some time back on "the relation of the currency to the social and economic progress of India" will prove interesting though not instructive to people who are troubling to devise means to place the Indian currency system on sound and stable foundations. Mr. Major disclaimed all originality in the views he propounded observing that he was merely expounding the opinions of the late Mr. Cecil Balfour Phipson, whose principles, he thought, had been unduly neglected by his countymen. The gist of the lecturer's argument was that a currency based on the precious metals or on anything intrinsically valuable was wasteful, and in other ways undesirable. Governments ought, according to him, to issue valueless money tokens, so regulated that on an average of years each token should exchange for a fixed quantity of food. "Currency is only needed" Mr. Major said, "as a token of value but as soon as it is associated with a valuable material it ceases to be merely a token and becomes a wasteful expenditure of resources." He therefore suggests the issuing of paper money in such quantities as will balance the quantities of food that are brought into the market. The larger the quantities of food coming into the market for the purchase of manufactures the larger will be the number of currency units the Government must put into circulation in order to keep the value of each unit from rising and the price of food from falling. Thus by stimulating the production of food surpluses the Government will only be taking the easiest and most effective means of increasing its own revenue without taxation. This idea is not new to the Government of India inasmuch as it has already converted the Indian rupee into a token by closing the mints, and artificially raising the value of the silver coin. But Mr. Major disapproves of the method according to which the Indian currency has been approximated to a totally distinct and foreign currency units. This mistake can, however, be repaired by the Government of India if it takes a further step and gradually replaces its "semi-civilised currency of silver tokens, each costing the State two-thirds of its currency value, by a wholly civilised currency of paper rupees, each costing the State practically nothing at all." If this ingenious suggestion is adopted, Mr. Major believes, all the seemingly insoluble problems which now hopelessly confront the Government of India will be solved. He then proceeds to indicate how such a change should be carried out. The savings of the more thrifty in the community under his scheme will be highly beneficial as they will cause so much money to be withdrawn from circulation and would necessitate fresh issues to keep up the amount of currency in active circulation. Government will have therefore to do its best to facilitate the saving of money and to insure the safety of such savings. This end can be best achieved by the establishment of a National Savings Bank which will not allow any interest upon deposits but will always have the depositors' savings represented by actual money so that a failure of the bank will be impossible. Mr. Major's currency system, it will be thus seen, offers substantial advantages: simplicity, freedom from the present embarrassments and the relief of the cultivator from the burden of taxation. It is needless to say that the Government of India and the Finance Commission will bestow upon

the ingenious scheme the serious attention it deserves. Its adoption will be a short cut to currency salvation and the wonder is the solution did not occur to Government so long. But now that it has been offered, we may expect to see all currencydifficulties come to a speedy end

Special Articles.

THE PROBLEM OF FUEL SUPPLY.

By a Professor of Agriculture.

AS civilization advances, the area of culturable land will increase and the jungles will continually be cut down. Again, with the advance of civilization, there will be greater demand on timber for arts, and the wood, in any the least degree useful to man, will continue to be less and less available for fuel. We have already begun to feel the pinch; we know by experience that fuel was not half so dear as it is now. Althongh human ingenuity has substituted several things as fuel in place of wood, *e.g*, coal, oil, gas, electricity, etc., yet from the poor condition of India we know that for many years we shall not reach that stage, where the use of wood as fuel will altogether cease. Hence there arises the question of adopting means of conserving the resources of the country. There are in several parts of the country forests which can supply wood for fuel, but they are in most cases too far from the towns on the plains. There is, however, one very paying way of meeting the demand. From his observations and experience, the writer quotes the following facts and figures.

Inga Dulcis is a plant that belongs to the *Leguminosea* order; it is commonly called in Hindustani Vilayati Babul. It takes about 10 years time to reach to a fairly large size. Its wood as timber is almost of no use, because it is extremely brittle. Its legumes are edible, and possess a peculiarly sweetish taste. Its wood forms very good fuel. Its cultivation is very cheap. It will grow even on poor soil, requires very little care, is not injured by the attacks of stray animals because of its thorns, and requires watering only in the early years of its life. It belongs to that class of plants, which have got the property of fixing the atmospheric nitrogen and thus indirectly enriching the soil by the incorporation of their roots when once the plantation is removed. The writer has found that, in the season of drought, the plants become richly loaded with legumes, and thus can afford food to poor people when other things fail; however about this fact, the writer is not certain whether his experience will agree with the experience of others.

Let us now calculate from facts and figures the cost of cultivation, and see what income one is likely to get from such a plantation. The man who takes up this business, we presume, is a petty Zemindar, can bear an outlay of about Rs 800 or 900 per acre, and can wait for 10 years for the returns. Such a zemindar takes an acre of land which will be a little more than 200 feet by 200 feet in area, and plants the trees in rows 10 feet apart. Thus, there will be 20 rows on an acre of land, and in each row, if we plant trees 3 feet apart, which is a fairly sufficient space, there will be 67 trees. Thus the whole plot will have 1340 trees on it. Now for ten years we leave the plantation undisturbed. A man is left in charge of it to watch it, and trim the trees from time to time, After 10 years we begin to cut down the trees in the following order: in the tenth year, we cut the rows Nos. 1 and 11, without in any way injuring the roots or desturbing the soil; in the eleventh year, we cut rows Nos. 2 and 12; in the twelfth year Nos. 3 and 13; and so on. By doing so, it will be seen, we take only $\frac{1}{10}$ of the plantation for market each year, and each row after it has yielded wood once, is not disturbed for 10 years. Thus when a plantation is grown 10

years old, it will give a continuous yield of $\frac{1}{10}$ of the number of trees each year, which will mean an yield of $\frac{1340}{10} = 134$ trees. Each tree on an average yields about 8 maunds of fuel, and thus $134 \times 8 = 1,072$ maunds of wood will be available yearly from an acre of land.

At this time, in towns, fuel is sold at the rate of 2 maunds per rupee, and there is every reason to fear rise in prices in the future; supposing prices do not rise, in rupees the price of this fuel will be $\frac{1}{2} \times 1,072 = 536$ Rs. Then again we get a very valuable seed from the plants. It is sold at the rate of Rs. 40 per maund. Each plant will yield a certain amount of seed per year, but the yield varies considerably from year to year. Taking 5 seers as the average yield per plant, we get annually $5 \times 134 = 670$ seers of seed worth so many rupees. The legumes of the plant are edible, but we do not charge anything for them; they are allowed to be picked up by poor people, on the condition that they will return the seed uninjured. Thus the total gross income that we shall derive will be $536 + 670 = 1,206$. Let us take the cost of cutting down the wood, dressing it, and picking the seeds, etc., as high as 50 per cent.; it will thus leave in the hands of an owner a sum of Rs. 603 per acre.

Now let us calculate the cost of cultivation. For each row we shall require a seer of seed; so for 20 rows, 20 seers; its price will be Rs. 20. The plants will require watering for the first 5 years, after that, rain water will suffice. The plants are irrigated with well water of good depth four times in a year, the cost of each watering being Rs. 4; the total for five years will be, Rs. $5 \times 4 \times 4 = 80$. The owner keeps one attendant to look to the work at Rs. 6 per month; in ten years the pay of this man will amount to Rs. $6 \times 12 \times 10 = 720$. Then the owner foregoes his ten years' rent. Rs 7 per acre is sufficiently good rent for a tract of poor soil though near towns. Ten years rent will be Rs. $7 \times 10 = 70$. Thus the total outlay in ten years will be $70 + 20 + 720 + 80 = 890$. We allow the owner to charge 12 per cent. interest on this outlay, *i.e.*, Rs. 106-12-0. Deduct this sum from Rs. 603 (—Rs. 106-12-0); we get a net profit of Rs. 496-4-0 per acre per year after ten years time, for a little perseverance, in a work which requires no special agricultural skill, and in which there is not the least possibility of failure owing to drought. Of course, the above facts and figures cannot be universally applied to all cases, but the way, in which we have made the calculations enables everybody to know beforehand his position from the circumstances in which he will have to work. *Mutatis mutandis*, he can draw up his balance sheet, and can know approximately the amount of profit he will get in his particular case. Can you show any better method to a Zemindar for getting so much per acre out of his land that is poor, if it fortunately happens to be near some town; and that too with so little labour, care, or anxiety?

PRINCIPLES OF ECONOMICS. *

BY. V. G. KALE, M.A., *Professor of Economics, Fergusson College, Poona.*

ON going through these two volumes we have no hesitation in saying that they make a valuable addition to economic literature. The book is not intended only for specialists or people who are already familiar with the elements of economics. Nor is it unworthy of their attention though designed for beginners, educated and intelligent persons, who have not made any systematic study of the subject. The author hits the golden mean, and though he writes for the uninitiated, he does not gloss over difficulties or avoid severe reasoning.

* Principles of Economics, two volumes, by Prof. F. W. Taussig; The Macmillan Company, New York.

'Being neither an encyclopedic treatise nor a text book of the familiar sort, it offers no voluminous foot notes and no detailed directions for collateral reading.' The style is easy and the exposition lucid. The book deals chiefly with the industrial conditions of modern countries and most of all with those of the United States. Some writers devote special chapters to the elucidation of economic history and methods of economic study and research. Others touch upon economic history and development in the treatment of the various topics as they are taken in hand. Prof. Taussig follows the latter method. He shows scant attention to certain topics which usually form subjects of discussion among economists themselves and scrupulously steers clear of elaborate definitions and lengthy dissertations on methodology and history of dogma. The subjective theory of value which has such a fascination for many writers has been lightly skipped over by the author as he feels that it is of less service for explaining the phenomena of the real world than is supposed by its votaries. The later tendency among economic writers is to give up the traditional system of the arrangement of their subjects. Older writers usually start with some definitions such as those of Political Economy, and of wealth and at once proceed to take up the main divisions of the subject in their regular order, production, distribution and exchange of wealth. Now-a-days, writers of economic text books often begin with a brief account of the development of economic thought and discuss the various schools and methods of economics and before proceeding to deal with production and exchange, explain the theory of value, a knowledge of which is held essential for a proper understanding of the other problems. Prof. Taussig's order of the topics has been determined more by convenience for exposition than by any strict regard for system. He has generally endeavoured to enter upon a subject only when the main conclusions relating to it can be followed to the end. This is not however always practicable on account of the intimate connection between the different parts of economics. Some writers lay particular stress upon the order of topics discussed. Thus Dr. N. G. Pierson, an economist of great eminence, relegates production to his second volume and takes it up only when he has dealt with value, rent, interest, wages, price, money, banking and so on, because he says the laws of production cannot be understood unless the above topics are clearly grasped. Then again, several writers omit taxation and finance from their book altogether or treat taxation alone at the end and that too very indifferently. Prof. Taussig has omitted public finance because he holds that its problems are not purely economic, being as much political as economic. He could not easily find a place for taxation and decided at last to put the chapters on this subject at the very close. No arrangement of the subjects can ever be perfect from the very nature of their close interconnection and Prof. Taussig's order of the topics is judicious and reasonable and as such not open to any serious objections. His frequent use of statistics and diagrams helps to illumine the exposition of economic theories and gives it a practical interest.

It would be impracticable and by no means useful, to follow the author from chapter to chapter as he develops the various economic laws. Suffice it here to notice his conclusions on some of the more important economic problems which have engaged public attention in recent times. Among the various causes to which the present rise of prices in India is attributed, a large addition to the rupee currency holds an important place. Prof. Taussig is a believer in what is called the quantity theory of money which has been vehemently denied by some writers and often erroneously stated. Brieflyput, the theory is that the value of money, under the simplest conditions, other things being equal, varies inversely as its quantity. The economists' usual qualification 'other things being equal' is of course important in the case of this theory also and the author is careful to state the various qualifications to which it is subject. He proceeds to point out that prices cannot rise in one country alone; sooner

or later all countries must share in the advance. In most countries of the world, prices cannot rise without a real increase in money which includes paper money, credit, bank notes, deposits, etc, along with specie! Hence they cannot rise for any considerable time or to any great extent, in the credit-using countries, unless in all other countries a parallel advance takes place, resting on more copious money. Though the recent rise of prices in India has its own peculiar causes, the above explanation must, to some extent, apply to the conditions in this country.

Another interesing problem on which economists are divided is that of international bimetallism. In point of its currency system India stands in a category by itself. While attempts are being made here gradually to work up to a system of an extensive use of gold coins accompanied by a limited use of silver money, there are people who have been advocating the throwing open again of the Indian mints to the private coinage of gold. They think that in view of the prospective economic development of the people in Asia and Africa, the concurrent use of the two precious metals is not impracticable and that therefore bimetallism has a sure future before it. Many economists have conceded the practicability of international bimetallism and the direct obstacles in its way have been political. And whatever the abstract possibilities of united bimetallism, the project never had a working prospect of realization. Under existing political conditions in the world the scheme has not the ghost of a chance of even a trial and therefore all discussion of the subject must only be academic. While the power of bimetallism to maintain the rates between gold and silver may be and has been allowed, it is far otherwise with the other merit claimed for it by the advocates of international bimetallism, the stability of the general range of prices. Would international bimetallism have maintained such stability? Prof. Taussig answers the question in the negative. Whatever doubt, says he, there may have been regarding the probabilities of the case,—and there was much about 1890—was set at rest by the new conditions governing the supply of gold which set in after that date. He adds :—"Bimetallism would have led not to stable prices, but to prices even less stable, and advancing more rapidly, than under the single gold standard The extraordinary increase in the production of gold has put an end, probably for ever, certainly for an indefinite period, to all proposals for rehabilitating silver."

Prof. Taussig appears to be a strong free trader. He states and dismisses the various arguments that are usually urged in favour of a policy of protection, though he is constrained to admit that under certain conditions young industries do derive an amount of benefit from protective duties. The United States of America are a nation of heavy tariff and the author, himself an American, is disposed to think that the advantages claimed for protection in that country are delusive. Certain favourable natural and national characteristics have tended to counteract the detrimental effects of protection there and the American industries whose prosperity is attributed to a high protective tariff would have thriven all the same. Political corruption, combinations and trusts, high prices and extravagance are some of the undesirable consequences which have followed in the wake of protection in America and the nation has been saved from disaster only by certain natural advantages it enjoys. At present a tendency is visible there to lower the protective duties levied upon imports and the new President of the States has taken up tariff reform as the first important question involved in national progress. This reaction against protection in America is accompanied by a reaction against free trade in England where the tariff problem is affected by imperial considerations and preference schemes. Protection is often defended with arguments which are weakened by the ignorance, the selfishness and a lack of wide outlook which they betray. These arguments have been easily refuted by Prof. Taussig so far as England is concerned. He observes :—"But these arguments are more insidiously dangerous in England than else-

where. That country depends for its very existence on manufacturing industries which are able to face the competition of the world. If once her own industries really lean on protection against foreigners, her knell is sounded. The only solid ground for advocating duties is to enable the diplomatists to higgle for lowered duties elsewhere. And the only ground for preferential arrangements with the colonies is to induce them to admit English goods with no duties or with lowered duties." The author would have done well if he had considered the question of free trade with special reference to the consequences to economically undeveloped and politically weak countries of unrestricted competition with manufacturing nations which are in a position to control the markets of the world. National and racial sentiment is nowadays stronger than mere economic considerations and we see mercantilism in another form dominant in various countries. The economist cannot afford to treat these forces lightly as they are powerful factors operating upon the policy of nations.

Prof. Taussig's chapters on the question of population are among the most interesting in the whole book. This is due to his description of the condition of various countries with reference to their population and the instructive statistics he has given. One fact to which he draws attention is the general decline in birth-rate in several western nations. This change has, however, taken place by a process different from what Malthus recommended and expected. The decline in the birth-rate does not synchronise with a dimunition in the marriage rate as Malthus would have wished. There is no question that the general situation —marriage rates virtually stationary and yet declining birth-rates—is due to deliberate abstention from propagation. The question which now faces the advanced countries and especially the more prosperous classes in those countries, is whether the preventive check is not likely to be carried too far. Great anxiety is being felt at the present moment in France on this aspect of the population problem. The author thinks that too much stress should not be laid on what is called "race suicide" and on the other hand, the good sides of restraint on multiplication should not be forgotten. Speaking of eugenics, he remarks that, in the present state of our knowledge, very little that is practical can be done to limit and control the perpetuation of the human species, especially when we remember the spirit of the times which breathe a universal demand for freedom of opportunity and individual development. There are several other chapters in the book which make most pleasant and instructive reading. Problems of labour and of economic organization have been handled in a masterly way and the author's views in general are very sound on all these questions. He does not write in the spirit of an advocate or partisan as economists often do. He deals with questions in the manner of the scientist and philosopher, thoroughly in touch with facts and social forces working in the western world. The detailed contents given at the beginning of the first volume, which are in the form of a topical analysis, are a great help to the reader. No student of economics can afford to go without Prof. Taussig's two volumes and we cordially recommend them to all those who wish to be initiated into the principles of economics with the assistance of a readable and up-to date text book.

INDIAN EXCHANGES.

By C. GOPAL MENON.

A great deal has been said in recent years of the absorption of gold by India, and a discussion of the subject and its influence on Indian Exchanges in the columns of the "Wealth of India" is quite appopiate at the present moment. Sir Edward Holden

in a recent speech, while he presided at the Annual Meeting of the London City and Midland Bank, pointed out that India is rapidly absorbing gold and in the last two or three years nearly forty per cent. of the total production of gold in the world has gone to that country. He added that the total production of gold during the past twelve years has been about 900 millions sterling, of which £100,000,000 has been imported by India. Sir Ernest Cable and other writers on the subject of gold drain to India calculate that nearly £300,000,000 of gold has been absorbed by India within the past 60 years.

One of the subjects that the Chamberlain Commission has to deal with is this gold supply and the necessity for introducing a free coinage with an open Mint in India. On the recommendaton of The Fowler Committee in 1898 an Act was passed making the British Sovereign legal tender in India at the ratio of 15 rupees, but owing to the delay caused by some technical questions, the Indian Mints have not yet been declared branches of the Royal Mint.

Prior to the establishment in 1899 of the Gold Standard in India, which has practically fixed the value of the rupee at 1*s.* 4*d.*, the exchange banker's position was rather risky and the flow of gold either for the purpose of industrial undertaking or commercial speculation was limited. The sterling value of the rupee was constantly fluctuating with the price of silver so that unless a banker could cover his sale of telegraphic transfers by the purchase of bills on the same day, or *vice versa*, he was liable to lose by the fluctuation in silver and exchange. Thus the price of silver in 1870 was 62 pence per ounce which declined to 25 pence per ounce in 1898, and sterling exchange which was 2*s.* per rupee declimd to 1*s.* $\frac{3}{8}$*d.* per rupee during the same period. It is therefore evident that the risk involved was considerable and no business could be safe unless the broker who offered transfers to a banker for forward delivery could find means to cover the same by bills on the same day. What is the position to-day? The exchange banker could do his business with ease aud little anxiety and fluctuations in telegraphic transfers rarely exceed 1/32 to 1/16 of a penny per rupee, or say about $\frac{1}{4}$ to $\frac{1}{2}$ per cent. and as the banker can always add this to his transaction, the gold standard has been a distinct advantage to the country.

The par of exchange is settled with the chances of a fall to a point where there will be profit on shipping bullion or a rise to a point where bullion will come in from abroad. The par of exchange is the pivot around which these movements take place, and fluctuations due to temporary causes are only limited.

Exports and imports affect exchange to some extent but these can only be for a short time. Indian imports are paid for by exports through the medium of exchange banks in India and the balance of trade is an important factor in reckoning this exchange. In India, exports largely exceed the imports. The funds which the London banker is able to lay down in the Presidency towns will fall far shorter than what he requires to pay for bills he purchases against exports. He has, therefore, to lay down funds in India by other means than purchasing bills in London payable in India, and the banker does this to a large extent by importing gold or else by the purchase of India Council bills. These Councils represent the payments which the Government of India has to make in England for interest on sterling loans, payments due to British troops in India, stores, pensions and several other things. Further, the revenue in India is collected in rupees. The Secretary of State in London sells weekly large batches of these bills on Calcutta, Bombay and Madras and gets the sterling amount required to pay the Home charges, and the Indian Exchange Banks buy these Councils and get the rupees required for financing the export trade in India. In the years in which crops are plentiful, and export good these bills are sold largely, and in famine years there is a dearth for these bills. For instance in 1908-9, a year of famine and scarcity, the sale of Council bills fell to £5,927,000, and in 1910-11, a year of prosperity

and good crops, the sale of Council bills amounted to £26,783,000. In the year 1911-12, the balance in favour of India was made up approximately, of Council bills £27,100,000 and the precious metals £23,860,000, and in 1912-13 Council bills £25,700,000 and the precious metals £30,082,000.

One matter, however, requires elucidation. The lowest rate at which the Secretary of State will sell bills is 1*s.* 3 $\frac{29}{32}$ *d.* which figure has been adopted as representing the "gold Export point" from India. In other words, if demand drafts on London are not obtainable at or above this rate, gold will be shipped abroad. The difference of $\frac{8}{32}$ nds. is the cost of shipping gold to England in settlement of India's liabilities in that country. On the other hand, if exchange passes the gold export point, and goes up to 1 *s.* 4$\frac{1}{8}$*d.* for demand draft London and 1*s.* 4$\frac{5}{32}$*d.* for telegraphic transfers, then it will be more economical for people who have to make remittances from England to India to ship gold than to purchase Council bills.

Now the question may be asked how gold finds its way into India. The gold standard at 1*s.* 4*d.* became effective as early as 1899 by the two processes of contraction of Indian currency and by the in- creased supplies of gold that got its way into India. These two causes have been in operation ever since the introduction of the gold standard, except in one year 1908-09, the year of a deficit of £3,737,000 in the finances of the Government of India.

The contraction of currency if left to itself or the increased supplies of gold if acting separately, would cause the rate of exchange to rise to 1*s.*4$\frac{1}{2}$*d.* and even higher, but when the rate reaches 1*s.* 4$\frac{5}{32}$*d.* the exchange banks in London ship gold to India. The banks can pay the expenses of shipping gold to India, providing for a small profit, and in addition to it they can get rupees out of the currency reserves in India for their exchange business. In this way, gold is obtained from England for payment into the reserves to exchange for rupees. These rupees go into circulation and the rate of exchange is continually kept from rising, except fractionally above 1*s.* 4*d.* It is impossible to keep the rate at this fixed rate of 1*s.* 4*d.* as it is bound to rise and fall fractionally according to the condition of the external trade of India and the Secretary of State's requirements for money in London. In ordinary times, the tendency for the currency is to contract, and to prevent this contraction, rupees are added to the currency. The new rupees can be got only by importing gold and exchanging it at the reserves. When this process goes on, gold accumulates in the reserve and supply of rupees become contracted. Then gold is withdrawn, silver is purchased with it and new rupees are coined.

As India is put on a gold standard, its currency follows the course of gold. When gold is produced in increased quantity in the world, India gets a proper share of the gold as witnessed in recent years. Prices in India of course, rise in sympathy with prices in the other gold using countries.

The present position in India is that are rupees, an unlimited legal tender, gold can be tendered at the reserves but not silver, and Government is under no obligation to give out gold for rupees. Sovereigns are also legal tender and the nett import of sovereigns from the 1st January 1900 to 31st December 1912 are £58,829,000 on private account and £5,817,000 on Government account. These figures are only approximate as detailed statistics of nett imports of sovereigns from 1910-11 onwards are not published. There is no mint for gold in India, and the sovereigns come to us from abroad., England, Australia and often from Egypt. Considering that India's gold standard has been an economic success, it is a matter for serious consideration for the Commission now sitting in London to decide whether the Mints should be opened for the coinage of gold sovereigns India.

The Agricultural World.

Destruction of Weeds by Deep Ploughing.

DEEP ploughing and thorough cultivation have long been recognised as perhaps the most efficacious means that can be directed to the prevention and eradication of weeds. There are several reasons why such should be the case and they are neatly summed up in the *Farm and Home*. (1) Some seeds of weeds rot when deeply buried for a time. (2) Most weeds are killed when deeply ploughed under. (3) Well-cultivated, deep, open soils are most easily freed from the roots of such troublesome weeds as couch, creeping thistle, onion couch, the bindweeds (convolvulus), and perennial sowthistle. (4) The seeds of weeds most readily germinate in an easy-working soil with good tilth, so that the seedlings can more quickly be killed by the use of the hoe, harrows, surface-weeder, etc. (5) The seeds of the cultivated crop germinate more quickly, and the crop grows more rapidly and vigorously, thus being able the more successfully to overcome the competition of weeds ; and (6) when a crop is saved for stock purposes from clean, well-tilled land, the resulting seed will be freer from the seeds of weeds—and this is perhaps particularly important in the case of the cereal grains, home stock of which is more often saved for seed than that of any other crop.

Cattle Poisoning.

Farmer's Bulletin No. 536 of the United States Department of Agriculture is by Mr. C. Dwight Marsh of the Bureau of plant industry. His conclusions may be summarised as follows :—

Stock seldom eat poisonous plants by choice, but only when induced or compelled by the scarcity of other food. It, perhaps, can not be too strongly impressed upon those using the cattle ranges that their losses may be very largely reduced if they will recognize this fact and take a few obvious precautions,

(1) Cattle should not be turned out upon the range where there is little to eat except poisonous plants. This is especiallyda ngerous when the stock have been on dry feed.

(2) In a region where certain areas are definitely known to be infested with poisonous plants, cattle should be kept away. This is especially necessary when the general range is short, either because grass has not started to grow or because it has been overgrazed. When the range is well covered with good grasses, herding away from poisonous areas is ordinarily unnecessary.

(3) When cattle are trailed from one place to another, they should, so far as possible, be driven through a country with plenty of good feed. If it is necessary to drive them through a locality supposed to be infested with poisonous plants, care should be taken to see that they are not hungry when going through this region. It is much better to make such a drive in the afternoon rather than in the morning. Special precautions must be taken when it is necessary to pass over a trail that has been used by many others, for all good feed will have disappeared and the stock will eat whatever is left. Sheep should not be bedded for several successive nights in the same place.

The Value of Stable Manure.

In a recent paper Dean H. E. Cook, of the School of Agriculture, Canton, N. Y., raises a question as to the value of stable manure in view of the cost of producing it. He says : "No more unfortunate opinion ever beset dairymen than the idea that their crop production must be measured by stable manure. Stable manure is important and valuable, but it has, in the minds of most dairymen, a fictitious value, or they would not keep cows to make the stuff. What is the use of putting feeds through an animal just to convert them into manure ? The animal has

no mysterious or patented apparatus to put plant food value into feeds. She simply chews the stuff, tolls it 25 per cent., and puts the nitrogen, phosphoric acid and potash in a form where 50 per cent. of it can easily be lost. That is what an animal dces. If it is manure we want, let us save all of these losses and leave the crops in the field and plough them under. No one realises what stable manure costs until the actual cost of handling is known and charged against it. We must not forget that at the best a ton is worth not more than 10s., and that it must be handled at the end of a fork or shovel. This is not an argument against manure, but an argument against manure manufacture that costs £2 to produce what is only worth 10s. In our accounting, at the school, we are, for want of a better method, charging the crop for the manure and for the actual cost of handling, and crediting the cows the same amount. Our first scheme called for a charge to the crop of £5 per cow for her manure. This was a great thing for the cow, but would have put one farm out of business. We can get nitrogen, phosphoric acid and potash cheaper from nitrate of soda, acid rock and muriate of potash and the organic matter to go with it from sods and cover crops."

Foot-and-Mouth Disease Germs.

The June issue of the *Bulletin of Agricultural Intelligence* gives a summary of the experiments conducted in specially constructed manure heaps for the destruction of the pathogenic agent of foot-and-mouth disease. "It has often been proved by experiment that temperatures of 60 to 70° C. (140 to 160° F.) may exist in manure heaps. As the agent of foot-and-mouth disease is killed by still lower temperatures, it may be concluded that manure from animals suffering from this disease is disinfected, if it is so kept that its temperature rises to 50 to 70° C. (120 to 160° F.) Hitherto, however, this had not been proved.

In 1912, the writer prepared a manure heap in such a manner that this temperature was quickly attained. He introduced the pathogenic agent into the manure and a few days later used it for inoculation.

The experiment was carried out as follows. A layer of straw 10 inches thick was laid down upon a concrete surface 9 ft. by 8 ft. to serve as a base upon which to pile up the manure. The latter was a mixture of fresh cow and pig manure containing much straw. In the experiment, fresh lymph was used; it was mixed with a 0·9 per cent. solution of common salt in the proportion of 1 to 20, and filtered through Chamberland filters; 15 cc. of this mixture was put into test-tubes, and some tubes of lymph were kept in the cellar to serve as a control of the virulence. In addition, the hoofs of a pig which had died of foot-and-mouth disease, were cut off, wrapped in gauze, and introduced. The writer used 12 numbered maximum thermometers for the measurement of the temperature. The thermometers, hoof-parings and lymph-tubes were equally distributed in the heap while it was being built up. Another the thermometer was put between the layer of straw and the manure. The heap was built up like a mangel-clamp and pressed down with forks; it was then covered with a layer of straw 4 inches thick, upon which was thrown a layer of dry earth of the same depth; the total height of the heap was 6 feet. After ten days, the manure was again spread and the thermometers, lymph and hoofs removed. The different thermometers registered from 55·5 to 75. C. (132 to 167° F.).

Pigs were then inoculated with the lymph and also with the hoof-extract, but they did not fall ill; but when inoculated with the control lymph they sickened. Thus the pathogenic agent must have been destroyed by the heat of the manure heap. It is therefore possible to make the manure from animals suffering from foot-and-mouth disease entirely free from infection, if the heap is constructed and managed in the manner described by the writer."

Efficient Milking.

A correspondent writing in the *Live Stock Journal* points out that milking demands a great

deal of attention or very unsatisfactory results will obtain. Where the milking and general treatment of the cows is neglected, or is left in the hands of inexperienced persons, the milk yield will quickly decrease, while at the same time the milk will be of poor quality, with a high bacterial content. Cleanliness is one of the chief items in connection with dairy work of all kinds, but no amount of skill in the dairy can counteract the ill-effects of the unsuitable treatment of cows and careless milking. Before commencing to milk, the cow's udder must be wiped clean with a rough damp cloth. Besides the milkers having their hands clean, they should also wear clean overalls.

In order to secure the greatest development of the cow's udder, the milking must be carried out completely, so that no milk remains in the udder when the cow is milked. If the milking is not carried out properly, and the cows are not thoroughly stripped, the milk yield will soon decrease generally in both quantity and quality. It is only where the milking is carefully carried out that the milking powers of the cow are developed instead of being injured, One cause of cows drying off for too long a period previous to calving is the failure to strip them. In order to obtain a prolonged lactation or milking period, it is necessary to carefully remove all the milk from the udder at each milking.

After having cleaned the cow's udder, and the milker washed his hands, the cow should be approached gently, and the milk drawn at a consistent rate. It is advisable to milk quickly, for this appears to be beneficial in increasing the flow, but at the same time jerking the teats must be avoided. Anything which causes discomforture to the cow may cause her to hold up her milk, and this of course is not of any benefit to the milk yield. A common indication of good milking is plenty of froth on the freshly-drawn milk. Good milkers will milk thoroughly seven or eight cows an hour, but this, depends upon the ease with which the cow can be milked. Some cows give their milk down freely, while others are hard to milk. The finishing off or stripping of cows is generally done by what is known as streak milking, in which the teat is taken between the forefinger and thumb, then lightly pressed or drawn downwards. By this method of stripping cows, practically all the milk may be removed from the udder. Milk of average quality contains about 3·5 or 3·7 per cent. of fat. The first milk drawn from the cow may contain only, say, 5 per cent. of fat, while the strippings usually contain 8 to 10 per cent. of fat. This shows the absolute necessity for the efficient stripping of cows as a means of keeping up the quality of the milk. The morning's milk is of poorer quality than the night's. This is due to the fact that the night's interval is the longest—the longer the interval bettween milking, the poorer is the quality of the milk. Whenever possible, the milking should take place at intervals of twelve hours apart; even then the morning's milk will be the poorer of the two but the difference in quality will be slight. Cows which are left too long without being milked often get extended udders, and this causes the cow to suffer pain as well as having a bad effect upon its milking proclivities. It often leads to the cow having an inflamed udder and in losing one of the quarters.

Agricultural Improvements.

The prover bial conservatism of the Indian ryot is a great stumbling block in the way of the agricultural officers in India. With these the problem has been how to induce the ryot to adopt the new ways recommended by them. The matter is being steadily discussed by the Board of Agriculture meeting every year and the agency of non-officials everywhere interested in agriculture is eagerly sought after. The improvement of agriculture in rural areas by co-operation or other means was seriously discussed in a meeting of officials and non-officials recently held at Coimbatore and we give below the gist of the discussions and the conclusions arrived at in the words of the President of the meeting, Mr. F. R. Hemingway, I. C. S. He said :—

It became obvious at once that it is essential for any progress, that we should create small bodies of earnest and intelligent men in the

villages to undertake practical agricultural improvements, and that little was to be expected from large bodies working in large areas. This was brought home to us by what has been done recently in Malabar, which was described to us by an Agricultural Assistant yesterday. What they did was as follows:—It was decided that the undoubted improvement of single seedling paddy planting should be introduced in that district, and certain members of the District Agricultural Association promised that they would induce a certain number of ryots in their own villages to try this experiment. An Agricultural Assistant was then directed to interview these gentlemen, and ryots in a number of suitable localities were induced to try the single seedling system of planting. The Agricultural Assistant went round the villages at the time of sowing and of planting, to see that the ryots were making no mistakes and generally to advise them. In this way you see, gentlemen, by a little pains a small body of workers was created. We then considered whether this sort of thing could not successfully be introduced in this district, and whether there were any demonstrated improvement in agricultural practice which could be confidently recommended to our ryots. We were fortunate in having good advice, and it was pointed out that green manuring and single planting would be an undoubted success on our wet lands. It was pointed out that in dry and garden lands, a good deal could be done by procuring pure seed of good quality, and it was suggested that new manures, namely, fish manure, and improved ploughs might be introduced with advantage, and it became clear that with proper attention to detail the Malabar plan might be introduced into this district. It was further pointed out by those interested in co-operation, though the question is not one of immediate importance to us, that it was possible that the ryots induced to introduce these improvements, might later on find it desirable to spend money jointly on their mutual agricultural needs, and collect a joint fund for the purpose and might thereby for the nucleus of an Agricultral Co-operative Society. We may hope that this may be so, and it is easy to see that experience may point out many ways in which such bodies of ryots might find co-operation beneficial. The Agricultural Assistant and the Officer of the Co-operative Credit Department might well be on the watch for such possibilities. Of course, it is not necessary to the success of the Malabar system that co operation of this kind should be introducted, and much can clearly be done without it ; but we ought not to shut our eyes to such possibilities.

Horticultural Research at Woburn.

The Woburn Experimental Fruit Farm was started in 1894 and the results of 17 seasons are now available for discussion. In many cases these are entirely contrary to accepted practice, and in fact experiments which were started with the idea of proving an object lesson in malpractice have forced conclusions in the opposite direction.

I. PLANTING.

Nearly 2,000 trees and bushes have been planted on 20 different soils, and in 8 different counties, with the object of ascertaining the effect of *ramming* the soil while planting, that is to say pounding the soil until it is effectually puddled. An analysis of the results shows that

72 per cent. were favourable to ramming.
17 do do ambiguous.
11 do do unfavourable.

The rammed trees were much more vigorous in every way, and their superiority as measured by increased growth was equal to 50 per cent. on an average. With such a method of planting, some damage must often be done to the roots, and each item of such damage as well as of other supposed bad practice in planting has been the subject of separate experiment. Shortening the roots up to removing one-third of their total length proved beneficial, as also did removing all roots less than 2 mm. in diameter, though loss of vigour has followed the removal of those up to 4 mm. In some cases the roots were bent and even tied in knots, and in others the roots were roughly brokn instead of being carefully trimmed,

without any detriment to the tree. These somewhat surprising results are quite natural when it is remembered that the life of the tree depends on the formation of new roots and not on the preservation of the old ones, and moreover that the majority of new roots do not even form near the ends of the old ones. In a large number of cases investigated, it was found that with apple on paradise stock only 15 per cent. of the new roots were formed within $\frac{1}{4}$ inch of the old root ends, 15 per cent. started from the stem itself, and 70 per cent. started from other parts of the main roots.

With regard to the proper depth for planting, this must vary with the nature of the soil and the habit of the plant, but will generally be within 6 to 12 inches below the level of the soil ; small variations of say 4 inches either way have been found to be quite immaterial, as the new roots have no difficulty in making their way to the level at which they flourish best. Trenching preparatory to planting has been tried on five different soils and has been shown to have little effect when measured either by the behaviour of the trees or by the alteration in the water and nitrogen content of the soil. The air supply of the roots was limited in some experiments by sinking an iron drum 18 inches deep and 3 feet in diameter around some apple trees, and covering the top 2 inches with cement. After 4 years the trees were apparently unaffected by this treatment. Since then they have rather fallen behind similar trees which were not enclosed, but this is quite possibly due to exhaustion of the limited amount of soil available for their growth and not to lack of æration.

II. PRUNING.

The importance of "cutting back," *i.e.*, removing half or two-thirds of each branch of a young tree when transplanted, was shown by leaving some young apple trees uncut. Their leaves showed a 25 per cent. deficit in size and little or no new wood was formed; but given that this operation was performed before the period of active growth commenced, it might be delayed till April without detriment. With regard to the annual branch pruning, three treatments were tried in various plantation : (1) normal, or the removal of $\frac{1}{3}$ of each new shoot; (2) hard, or the removal of $\frac{2}{3}$ of each new shoot; (3) no pruning.

The relative sizes were as follows :

	Normal	Hard pruned,	Unpruned.
	—	—	—
After 5 years	100	87	133
,, 10 ,,	100	82	107
,, 15 ,,	100	87	102·5

These results leave no doubt that the less a tree is pruned the larger it becomes. At the same time it was shown that growth as measured by the total production of wood including clippings is least in the hard pruned tress; this deficiency in growth is greater in height and spread than in the girth of the stems. The weight of fruit from unpruned trees was double that from the normally pruned trees and about four times that of the hard pruned, and the increase in crop was not accompanied by a marked reduction in the size of the fruit. Taking an average of 10 years, the apples of unpruned trees were 4 per cent. smaller than those of the normally pruned trees, and 18 per cent. smaller than the hard pruned trees,

These results naturally apply only to young trees; with older trees where branch formation is comparatively insignificant, severe pruning caused the production of new wood to be tripled. Having established the principle that the growth of a tree varies inversely with the amount of pruning, it must be borne in mind that the growth of a young tree must also be conditioned so that when it comes into bearing it will carry its crop to greatest advantage, and to this end some pruning will be necessary. Therefore as a general principle it would be advisable to do a certain but decreasing amount of pruning for the first 5 or 6 years after planting, at which time the annual pruning may be reduced to the removal of the few terminal inches of twigs which usually consist of imperfectly ripened wood.

Pruning has been performed in early autumn, in mid-winter including the severest

weather, and in spring, without obtaining any appreciable differences, but the results with regard to summer pruning are still somewhat ambiguous. That trees should be pruned to outside buds, also that the cut should be slanting and close to the bud appear to be unimportant details; in fact, with regard to the latter, trees, pruned 2 inches above a bud have always done better than those pruned in the orthodox way, no doubt, because the bud is weakened by having the wood cut away so close to it.

With regard to *root pruning*, some tree that were root pruned every 4 years only attained 75 per cent. of the size and 44 per cent. of the produce of the unpruned trees after 15 years; others that were root pruned every two years only attained 35 p r cent. of the size and bore an insignificant amount of fruit, and lastly others that were root-pruned every year all died before 15 years. Thus, root-pruning is shown to be a very severe check on vegetation and should be rarely resorted to, though it may be inevitable in the case of a strong-growing wall tree.

III. MANURING

21 plots each containing 18 dwarf apple trees were divided into three groups: (1) received a normal dressing of manure (12 tons of farm yard manure per acre or its equivalent in artificials); (2) received less than the normal or none, (3) received more than the normal (up to 10 times the artificials and 30 tons of dung).

Even after 17 years, the annual mesurement of the leaf size, a triennial measurement of the trees, and the annual records of the value of the crops showed no differences, and the results are the more astonishing as the Woburn soil is not particularly fertile : the layer of good soil is only 7 inches deep and beneath it is a stiff clay sub-soil which the roots of the trees penetrate with difficulty. After the first 10 years one lot of trees was removed, the manurial treatment continued, and farm crops grown, and it was found that with these crops the manures had the ordinary effect which they have on other soils. The experiment with apple trees was also repeated in a very poor sandy soil, and here the effect of manuring was very considerable, showing that the method of experimentation was not in fault.

On the other hand, with bush fruits on the Woburn soil, manures have proved absolutely essential, and dung far superior to artificials except in the case of strawberries.

IV. MEASUREMENT OF RESULTS.

The total weight of the crop and the average size of the fruit must always be supplemeted by data less dependent on seasonal fluctuations ; *viz.*, *growth* must be measured. In order to do this, when the experiment is a short one, lasting 3 or 4 years, the trees are lifted and weighed. With longer experiments, measurements are made of height, of the spread of the branches, of the girth of the stem or of the length of wood formed during a season, or the relative size of the leaves is determined. The results obtained by these various methods have been compared with each other and with the determinations of dry matter and nitrogen in the leaves. They all show a substantial agreement, though naturally the magnitude of the differences is not the same. —*Bulletin of Agricultural Intelligence for April.*

Cost of Cotton Production.

The *Westminster Gazette* in a special article refers to the discovery by a German named Schuetze, who is now in London, which he claims will reduce the cost of cotton production by one half. The discovery is patented in Germany. The process, in which grafting plays a prominent part, purports to eliminate the annual resowing, thereby effecting an enormous saving in labour. It is further said that it will restore the natural perennial character of the plant while maintaining the yield and render it immune from insect pests and frosts. Experiments hitherto have been conducted in East Africa. The price of cotton regulates the price of cloth and if the new discovery should turn out true, no body in the world need go half clad at all.

Recommeded Implements.

The Department of Agriculture, Bombay, has published a Leaflet, No. 2 of 1913, giving a list of Implements recommended by the Department. They are :—

No.	Name of Implement.	Price.	Advantages.
	FOR SIND ESPECIALLY.		
	(But Nos. 2, 3 and 4 are useful elsewhere.)		
1	Ploughs, Egyptian model ...	Rs. 5 on Farm or in Hyderabad.	Do more and better work than Sind ploughs.
2	Scraper	Rs. 7 at Mirpurkhas Farm.	Will do quicker levelling or bund work than the country 'keen.'
3	Norag or threshing machine.	Rs. 35 at Mirpurkhas Farm.	Will do better and cleaner work with 1 pair of cattle than 7 cattle can do by treading out.
4	Winnowing machine for cleaning grain.	Rs. 150 at Karachi.	Will cleanse a large quantity of grain in a day, the amount depending on quantity of dirt and kind of grain.
5	Dutch wheel water lift ...	Rs. 400 at Karachi	For 2-3 feet lift. Raises as much water as 7 hurlas and lasts for a long time.
	FOR KONKAN ESPECIALLY.		
	(But No. 8 can be used else—where and 9 wherever grass grows well on fairly level land.)		
6	The W. K. S. plough ...	Rs. 18 at the Alibag Farm.	This plough is of general utility and works well on both heavy and light soils. It opens a furrow of 3 inches to 3½ inches in depth and 6 inches to 8 inches in breadth. It can be worked by a good pair of buffaloes or bullocks. It is useful both in the khariff and rabi seasons and practically does double the work of the ordinary wooden plough.
7	The Meston plough ...	Rs. 6-8 at the Alibag Farm.	This plough is suitable for light soils. It is easy of draught and works well. This does much better work than the ordinary wooden plough. A pair of ordinary cattle can work this plough.
8	The American leveller or pethari.	Rs. 17 at the Alibag Farm.	This is useful for levelling rice fields. This does far better and more work than the wooden pethari. It can be worked by one man.
9	The grass mower	Rs. 193 in Bombay	This machine is worked by a pair of buffaloes and 5 men can cut 5 acres of grass per day. The land, however, should be cleared of bushes, stones, etc., to make it suitable for the working of the machine. The expenditure incurred in making the land suitable is more than repaid even in the first year by the saving effected in the cost of cutting grass. The mower does the work of 50 men.

List of Implements recommended by the Department—continued.

No.	Name of Implement.	Price.	Advantages.
	FOR OTHER PARTS OF THE PRESIDENCY.	Price at Poona.	
10	C. T. 2 plough	Rs. 40-5-0 ...	Light to medium black cotton soils.
	C. T. 1 do.	Rs. 45-0-0 ...	
	Arlington No. 30 with one extra share.	Rs. 40-10-0 ...	
11	S. A. E. (Gallows) plough.	Rs. 64-0-0 ...	Medium to heavy black cotton soil.
12	Iron plough carriers	Rs. 2-8-0 ...	For carrying iron ploughs without damage.
13	Disk harrow	Rs. 60 to Rs. 90 ...	For breaking up stubble after harvest and making ploughing easy afterwards.
14	Clipper five row seed dril.	Rs. 55 ...	For sowing all crops except cotton and ground-nut.
15	Planet junior hand hoes, double wheel.	Rs. 14-4-0 ...	For interculture of crops sown in rows.
	Planet junior hand hoes, single wheel.	Rs. 10-11-0 ...	
	FOR SPECIAL PURPOSES.		
16	Chaff cutters worked by hand.	Rs. 10-5 to Rs. 40.	For chaffing karbi to prevent waste in feeding to cattle on small and medium-sized holdings.
17	Sangli iron mhot—		More durable and cheaper than leather mhots, if properly fixed. A flexible wire rope (Rs. 5-10-0) and thimbles for the same (Rs. 3-8-0) can be used with advantage; also iron pulley Rs. 10-6-0.
	Capacity 35 gallons ..	Rs. 10-0-0 ...	
	,, 45 ,, ...	Rs. 11-8-0 ...	
	,, 55 ,, ...	Rs. 13-8-0 ...	
18	Chain pumps worked by hand	Rs 60 to Rs. 90 ...	For raising water for lifts not exceeding 10 feet.
19	Iron sugar-cane mill. ...	Rs. 120 ...	More economical and much quicker in crushing cane than wooden mills.
20	Poona pan for boiling juice.	From Rs. 20 ...	They are shallow and gul can be made quicker and better than in the deep pans used in Kanara and Satara.
21	Scum strainer	Rs. 6 ...	Prevents waste of juice when scum removed in manufacture of gul.
22	Gul moulds	Rs. 2 ...	Saves waste of molasses and block of gul can be removed easily.

The prices given above are liable to variations. Persons wanting any of the implements should write to the Superintendent of the nearest Government Farm in the Bombay Presidency, who will either procure them or state where and how they can be obtained. Many of the implements are, it appears, kept in stock on Government Farms where their use can be demonstrated.

The Co-operative World.

Origin of Co-operation.

IT will be interesting to know whence the thought of Co-operative Credit originated. It is recorded that when His Holiness the present Pope was the Vicar of a parish in Venice, he was for a long time disturbed in mind over the great poverty of his flock, and the sordidness of their surroundings. The staple industry of the parish was viticulture, or the culture of the grape. Vines, several hundred years old, existed in the plantations, but at this particular period (the early " eighties, ") these vines, from lack of manure, gave but an ever-decreasing yield. The depressed cultivators could hardly keep themselves and their families in comfort, much less afford to the vines the manure that was needed.

The saintly Priest Sarto began discussing the problem with his friends, and at last determined to start an agricultural bank, which would provide his people with the necessary funds to purchase their manure.

Steadily the depressed community began to rise, and it is said that when the Priest left Venice his parishioners had emerged from entire destitution into a fair command of wealth.

As these agricultural banks continued their work, it was found that the community served by them responded with greater enterprise if it provided some part of the capital, that is to say, co-operation by the community set before it such an ideal of self-help, that the capital lent to the individual was used to greater advantage, and expended with greater care. The Agricultural Bank was soon superseded by the Co-operative Credit Society which is working wonders all over Europe.—*The Rivikirana.*

Principles of Co-operative Credit.

Mr. Charles Roden Buxton has written an article under the head of " Credit Banks " to the *Bedrock*, a quarterly review of scientific thought. The article is intended for people in England where co-operative credit has not made much progress. It will no doubt be read with interest in India.

The increase of small holdings and the promotion of their prosperity are now recognised by all parties as a proper object of State action. The small holder has many difficulties to contend with. One of them is the difficulty of obtaining credit on cheap and reasonable terms. It is obvious that such credit is one of the essentials of success. Yet at present he either goes without it, or else borrows from the pawn-broker or the credit-giving shopkeeper under ruinous conditions. The problem, however, is not insoluble. It has been to some extent solved in other countries by the creation of Credit Banks, Credit Societies, People's Banks or Agricultural Banks, as they are variously called—a German invention, dating from the middle of the nineteenth century. Government can do much to help these institutions, and there is hardly any sphere in which so light an amount of public money or credit will produce so beneficial a result.

Why, it may be asked, do not the great joint-stock banks, with their elaborate and ubiquitous machinery, solve the problem ? The answer is simple. These banks provide in the main for men of substance. Trifling and infrequent loans to men of small means, possessing little or no visible security, do not constitute a particularly profitable business for an ordinary bank, which finds that it pays better to deal with "bigger men."

DEFINITION OF CREDIT BANK.

A credit bank is an association, registered under the Friendly Societies Act, 1896, for the purpose of receiving deposits and lending money to its own members. These are men in humble circumstances, living within reach of

each other and personally known to each other. The area should be a parish or a small group of parishes. It is important that the members should be of something like the same social standing and financial position; if two or three stand out as wealthier than the rest, they will be looked to for payment, and the responsibility will not be felt to lie equally on the shoulders of all. The most essential feature of a credit bank is the nature of the loans which it makes. They are invariably small, ranging perhaps from £1 or even less, to £40 or so. Next, each loan is for a specific purpose, which must be clearly stated and definitely understood. It may be for the purchase of a plough or other implement, the purchase of a horse, cow, pig, or what not, or the erection of a shed or cow-house. The purpose must be reproductive. No loan is granted unless there is a reasonable assurance that the money will produce profit and make repayment easy. These things are distinctly laid down in the rules. The loans are always for a fixed time, though its length may vary to any extent according to the needs of the applicant, and the time of the year. The business is managed by a Committee, elected by the members, which gives its services free, but receives out-of-pocket expenses. In the form of bank which is usually adopted in rural districts, there are no shares, and therefore no dividends. A credit bank is not a profit-making institution, but a co-operative scheme for providing certain benefits for its own members. Its object is to enable them to make a profit on their individual transactions.

SECURITY FOR LOANS.

The security for the loans is ample. It consists, first of all, in the personal knowledge of the applicant, possessed by the Committee; secondly, in the requirement of two sureties, themselves also personally known to the Committee; and thirdly, in the unlimited liability of every member. This is the corner stone of the system. Each member is individually liable for the repayment of the debts of the bank. The Agricultural Banks Association of Germany, embracing more than 3,000 societies, reports that neither member nor creditor has lost a farthing by them since the establishment of the movement in 1849.

DEPOSITS.

Speaking of deposits, Mr. Buxton says, the very smallest sums are welcome The true idea of a credit bank is that the people of a locality, instead of putting their savings into savings banks or other institutions which will send the money away to the great centres, invest it locally. There is, indeed, a strong inducement to them to do so, in the fact that the bank is administered by local people whom they know; in addition to which, they have the satisfaction of knowing that the money is being used to help and fructify their own district. This side of the business needs very careful consideration. It is clear that the local use of the money is a very considerable inducement to many small investors. On the other hand, if the investment is to be on really good security, it ought to be guaranteed by a strong central institution with the credit of the State behind it. There is much to be said for the view that deposits should be received through the post offices and paid into a Central Agricultural Bank, while being at the same time ear-marked for the particular localities from which they come. Such a Central Bank has the further advantage that it can establish a balance between one local bank which has a superfluity of deposits, and another which has not enough.

In practice, a Credit Bank is often put on its legs at the outset by one or two loans from wealthy people in the district. Three, four or five per cent. is paid on loans, and the money is lent to members at 5 or 6 per cent. In Ireland, where the Credit Banks number between 200 and 300, the Department of Agriculture has lent to them some £17,000 at 3 or 4 per cent.; they have thus been enabled to lend to their members at the popular rate of 1*d.* per pound per month.

PERSONAL CHARACTER OF THE SECURITY.

The kernel of the Credit Bank question is that personal character constitutes a security at least as valuable as property, but that without some kind of organisation this security

cannot be made effective for borrowing money. It is the function of the Credit Banks to provide this organisation. The ingenious notion of a few German reformers has brought a new social force into beneficent play. The Credit Bank is the "capitalisation of honesty." It has a marked educational effect; encouraging the sense of responsibility in the members, teaching them the value of thrift and the spirit of combination.

PROGRESS OF CO-OPERATION.

The system has attained wide dimensions in Germany, Belgium, Austria, France and Italy. It is beginning to flourish in India. It has been introduced into Ireland. In England its growth has been extremely slow, but it has been steady. In 1908 there were 20 Credit Banks affiliated to the Agricultural Organisation Society, in 1909, 29; in 1910, 35; and at the present time there are 42. Several of these were formed at the same time as, and side by side with, small holdings or allotments societies.

DANGERS AND DIFFICULTIES.

As in all new movements, there are dangers and difficulties to be faced. One of the dangers to be guarded against is that the proposed new Credit Banks may be perverted to other uses than those for which they were intended. There is now a considerable demand on the part of large farmers for State aid in purchasing their holdings. Care should be taken that the Credit Banks are not employed for this purpose, to the detriment of the small man whom they are intended to help.

Among the difficulties must be counted the probable opposition of the joint-stock banks. If the Government can find some way of working through them and enlisting their co-operation, so much the better; but we must beware that they do not, while undertaking to nurse the infant, quietly starve it. The great banks have really little to fear. The effect of the Credit Bank System is to create new business among people who have hitherto made no use of banking facilities at all. This new business will act as a feeder to the larger business of the established institutions. Bankers in Ireland at first doubted this, but are now beginning to admit it freely. Still it cannot be expected that English bankers will take this view at once. They have heard little of Credit Banks before, and these appear to them in the matter of receiving deposits, at any rate, as possible competitors.

And lastly, we have the difficulties which arise among the very people whom we want to assist. New ideas take root slowly. Country people find it hard to combine—much harder than do the townsmen. Some active spirit is needed to start the bank and keep it going; and too often he is not to be found. In many places, owing to the mixture of large and small holdings in England, there are not enough small men living close together to create the conditions under which alone, a Credit Bank can flourish. Some are frightened by the liabilities they must incur—though in practice these are but nominal. Others are alarmed at the idea of revealing their exact financial position to a committee of their neighbours. But difficulties such as these are not insuperable. They are made to be overcome and they can be overcome. The system is growing from year to year, and only needs a little judicious encouragement from above to make a vast difference to the prosperity of our English small holders.

Co-operation in Agriculture.

Mr. K. Ramasawmy Iyer, an ardent co-operator in Madura, read a paper on "Co-operation in Agriculture." on the occasion of the celebration of the Agricultural college day at Coimbatore. In the course of his paper, he said :—

"Though the Departments of Agriculture and Co-operation were created by the Government independently about the same time, and they have been working separately, it is now strongly felt that unless they work together, it is not possible to achieve any measure of success in the near future. Year after year, the scientific department of the college has been demonstrating the value of a particular method of cultivation or of an improved implement, or of adopting remedial measures for preventing

the destruction of crops by pests, and numerous leaflets have been published, at considerable cost, describing them. But these seldom reach the ryot. Co-operative Societies can be made good channels by which these improvements can be carried to the ryots. In the words of Mr. Buchanan:—"If the two Departments so work together, and if, most important of all, the people themselves, and especially the more enlightened classes, co-operate, the history of the next fifty years will have much to tell of improvement in the lot of the Indian peasantry."

By collectively buying manure, seeds, machines, and all raw materials or products used in agriculture, a considerable saving could be effected in the price of such articles. A collective purchase of manure has been adopted in one or two Co-operative Societies with remarkable success. The first experiments having proved exceedingly profitable, great eagerness is felt for the collective purchase of commercial fertilisers, such as superphosphates, etc., from wholesale firms. With regard to the seeds of particular crops, especially with reference to cotton, there is already a great demand for it. I cannot say the same thing with respect to the supply of implements, as those that are now in use are all still of a primitive type and do not cost much.

The sale of agricultural products is at present entirely in the hands of middlemen, who go from village to village, or appear at weekly markets, and purchase commodities at prices which are distinctly unfavourable to the ryot. Once they are taken to the market, it is not profitable to take them back. The dealers form a ring, and force these people to sell at the price offered by them. Very often they are taken to retail dealers, in urban areas, where similar combinations are not uncommon. Except in the case of very large landowners, we have never seen farmers getting favourable terms for their produce. There is ample scope for a co-operative organization to step in under such circumstances and relieve the ryot of much of the hardship that he is put to at present in the sale of his produce. Already the existence of two well-conducted Societies in a paddy-producing area has attracted the attention of the manager of a large rice mill near Madura, who has offered to purchase all the paddy grown in the area, through these Societies; and negotiations are now progressing. It may not be possible to make great progress in this direction, except in certain isolated centres, until the people become thoroughly acquainted with the management of business concerns.

In many cases it is advantageous to transform the raw products, so as to render them fit for immediate consumption, such as converting canes into jaggery and sugar, paddy into rice, corn into flour, milk into butter and ghee, and so forth. This can be done by means of co-operative organisation, but it is a risky thing to embark on such enterprises, in the present stage of the co-operative movement in this country. But we have to popularise such ideas among the masses, so that they may be readily assimilated and translated into action in the near future.

There are several villages in which it is possible to introduce labour saving machinery, which can be purchased and owned collectively. I have noticed that in places where betel vines are grown largely, it is highly economical to lift water by means of oil engines. Flour and oil mills, paddy huskers and cane crushers can be owned in common. As in the previous case, the time is not ripe for starting such enterprises on a large scale; we have to proceed with extreme caution.

The subject of agricultural insurance, which is so successfully adopted in European countries is quite foreign to India. Very little information is available, and it will take a long time before any attempt can be made in this direction. Cattle Insurance Societies have been started in Burma, but they are only in an experimental stage.

"Protection of crops against various causes of destruction by means of co-operative vigilance is another form of co operative activity which our country is not yet prepared to take in

hand. There is the greatest need at present for co-operative action in the improvements in stock of cattle by collective purchase and ownership of the best animals. As I said before, our people have to be thoroughly trained to business habits before they can be entrusted with the management of such concerns."

Co-operation in England.

The annual meeting of the Agricultural Organization Society was held on June 26 at Caxton Hall, Westminister, Mr. Yerburg, M. P., presiding. The society, which exists to promote the principles of co-operation among the farmers of England and Wales, was until recently entirely dependent upon its own resources, but it is now to receive a proportional grant under the new Development Act.

The report pointed out that 11 years ago the number of affiliated co-operative agricultural societies was 25, with a membership of 517 and a turnover of £9,467. On March 31 last, there were 478 societies, a membership of 48,000, and a turnover of nearly two millions sterling. It was estimated that about 55,000 gallons of milk were now dealt with daily by co-operative dairy societies. A beginning was being made this year in Yorkshire and Wales to organize the sale of wool on co-operative lines.

The Chairman emphasized the fact that the society was not a trading concern and only existed for propaganda work. He believed that the block grant from the Development Commissioners would be a substantial one, and that in addition there would be granted a sum up to a certain maximum on the basis of £1 for every £1 voluntarily subscribed. One of the greatest problems before them in the near future was the establishment of co-operative credit societies, and he hoped this problem would be happily solved by this time next year.

Mr. C. Bathurst, M.P., said that although they accepted a Government grant for propaganda work, they had not the least intention of letting the society become a branch of the Board of Agriculture. One of the greatest needs of the farmers to-day was cheap money, and anything that could be done to meet this need would be to the great advantage of the industry.

Malpractices in Co-operation.

The co-operative movement in India is hardly ten years old, and so far, it has done fairly well enough. What little progress has been made is due to the fact that activity hitherto has been mainly confined to the expansion of credit facilities, that a Government agency has been conducting the audit, and that the non-official agency that has taken an active part in the propagation of the co-operative idea has been drawn from a superior class of people with ideas of duty and responsibility ; such non-officials are always limited in number and with the growth in the number of Societies, lack of enthusiasts and laxity of supervision are bound to tell on the healthy progress of the co-operative movement. As it is, we have not heard much of dishonest practices in connection with the management of co operative societies, but we believe it is due to the limited number of societies, efficient Government supervision and management by picked non-official agency. It may be also that we have not heard of many cases of dishonesty or mis-management, because the authorities concerned have not chosen to publish them lest the movement should be discredited. There is no doubt, however, that, as in all human institutions, there are weak points in co-operative administration as well. Some of these are pointed out by Dewan Bahadur L. D. Swamikkannu Pillai in his report on the working of the Co-operative Societies in the Madras Presidency during the year ending June 1912.

The principal abuses and dangerous or dishonest practices which have been found to exist in societies are :—

(1) *Heavy cash balances.*—A society has no business to keep a heavy cash balance when it should either have returned it to the Central bank or disbursed it as loans to members. When collections have not been credited to the proper head and have been temporarily

misappropriated, the natural expedient is to show them as a cash balance. The entry costs nothing until an inspection is made and when an inspection is made, the Secretary or President may avoid the risk of prosecution by "showing" the required amount to the Inspector.

(2) *Loans to panchayatdars.*—Many societies are under the impression that the panchayatdars are entitled by precedence to the first or the largest loans. In the beginning it may have been necessary to induce the leading men in a village to form a society in the hope of extricating themselves personally from debt; but now we are in a position to exact more stringent conditions and not to allow panchayatdars in future societies to monopolise the loans.

(3) *Benami loans.*—A President or Secretary who wishes to seem impartial may cause a loan to be advanced to a friend when he himself is to benefit by the loan. This plan may be resorted to not only in order to rebut a charge of partiality but to enable a borrower to have more than the maximum loan he is entitled to under the by-laws.

(4) *Refusal to grant receipts.*—Ryots are generally careless about receipts: they do not ask for them or they are not careful enough to preserve them. A Secretary or President may withhold receipts, and with immunity appropriate collections to his own use. The borrower is thus deprived of the means of proving his case.

(5) *Personal Security.*—The co-operative staff rightly advocates the giving of loans on suretyship instead of on mortgage of immovable property. But the by laws of the older societies do not always prescribe the limit up to which a person may stand as surety and cases have come to light in which a member whose property is not worth Rs. 500 has stood surety for different persons up to Rs. 1,000. A dangerous variant of this practice is when illiterate persons are represented as having stood sureties for one another and a document only containing marks instead of signatures is forged to support the story, with the connivance of a bazaar witness, who it may be, is the only literate person among the parties to the documents. This is a convenient expedient to avoid showing a large cash balance where the Secretary or President has committed temporary misappropriation.

(6) *Laxity in collecting arrears.*—Panchayatdars who themselves owe the society large sums of money are naturally lax in collecting dues from others. A few big defaults may be masked under a general show of rigour in petty cases: or the small borrowers may be made to pay up in order to qualify the society for an extension loan from the Central Bank by remitting to the latter one-tenth of the principal due. A few societies are notoriously lax in collecting arrears and if they do not improve, the only remedy will be to dissolve them.

(7) *Re-loans to members.*—Occasionally a borrower is made to execute a fresh bond, so that his default may disappear from the loan ledger. When this device is largely resorted to, the risks are very grave. I am introducing a liability register which will show the history of the transactions of a society with every borrower and every surety, so that it may be clear at a glance whether a member's capacity to borrow or to stand surety has been exceeded at any time and whether repayments in the ledger to his credit are entered genuine.

(8) *Re-loans to societies.*—When a society applies for a second or a third loan, it is sometimes intended merely to discharge an instalment overdue to the Central or District Bank. If the society has done nothing to pay the instalment in the regular way, *i.e.*, by means of collections from members, or if it has used collections imprudently for granting fresh loans to members when an instalment to the Central Bank was overdue, the society is without excuse. Loans from Central Banks are applied for by societies invariably on the ground that members (old or new) want them but the officer who recommends the loan to the Central Bank cannot always discover subsequently whether the amount has been properly utilised. Frequent inspection is necessary to obviate this danger.

(9) *The one-man society* is the ninth and last danger. Though there is always a panchayat, its active interference in the affairs of a societey is not always in evidence. When one man does everything for the society, keeping its accounts and money, recording panchayat and general body resolutions, sanctioning and collecting loans, etc., and that man happens to be unscrupulous, all the evils above noted may co-exist and they may be difficult to detect, because no one except him is aware of the transactions of the society. General illiteracy in a village is one source of this risk but there are illiterate villages, especially in the Kallar tract, which are wide awake in regard to their interests, whereas there are literate villages which look upon their society as one man's business.

Luckily, observes the Registrar, an abuse cannot go on for any considerable length of time without making itself a subject of complaint, and the best defence of the Raiffeisein system is, that unlike what happens when an influential man commits a crime and bribes or coerces the villagers into silence, the presence of a dangerous or dishonest practice in the management of a cooperative credit society betrays itself in the very looks and demeanour of the villagers the moment one steps into the village, although it may be next to impossible to bring about a criminal conviction.

The evils are likely to spread if not checked in time and they can be checked only by inspection. No measure of reform or improvement to be undertaken among societies is comparable in urgency to the need for thorough, systematic inspection, and it is mainly with a view to securing adequate inspection that the Hon'ble Mr. Swamikannu recommends the establishment of district unions and the grouping of societies into local unions.

Agricultural Co-operation.

The development of agricultural co-operation is shown by the following table, which gives for most of the countries of Europe (1) the number of persons engaged in agriculture with the respective percentages of total population; (2) the number of co-operative societies ; (3) the number per 10,000 of such persons; and (4) the number of acres of cultivated area per co-operative society. The table, which is taken from the Report to the Board of Agriculture and Fisheries on *Agricultural Credit and Agricultural Co-operation in Germany* [Cd. 6626, price 5s.], affords a comparative view of the present position of agricultural co-operation in the most imporant countries of Europe. A better criterion than the mere numbers of societies per 10,000 persons would be that of their membership, but unfortunately such data of trustworthy kind are available in only a few cases :—

Country.	Numebr of Persons occupied in Agriculture.	Percentage of such Persons to Total "occupied" Population.	Total Number of Societies.	Number of societies per 10,000 such Persons.	Number of Acres of Cultivated Area per Society.
Great Britain .	1,508,767	9·2	520	3	28,375
Ireland ...	871,989	44·7	970	11	3,378
Austria ...	8,205,574	60·9	10,515	13	2,531
Belgium ...	697,372	22·7	3,841	55	943
Bulgaria...	1,739,181	82·6	693	4	13,816
Denmark .	530,689	48.2	1,220	23	5,287
France ...	8,843,761	42·7	7,200	8	8,226
Germany .	9,883,257	35·2	26,026	26	3,058
Holland ...	592,774	30·7	1,376	23	1,606
Hungary...	6,055,390	69·7	5,006	8	7,110
Italy ...	9,666,467	59·4	8,630	9	3,964
Russia ...	18,245,287	58·3	11,192	6	...
Switzer land ...	481,049	30·9	5,366	111	...

Agricultural Co-operation in Madras.

For some years past, strenuous endeavours are being made by the Government and the public to improve the lot of the agriculturist

in India. The agricultural departments and associations are trying every means to induce the ryot to adopt improved methods of cultivation and co-operative societies are placing cheap money at his disposal.

In some of the provinces, notably the United Provinces and Bengal, the agricultural and co-operative departments have been working in close contact. In Madras however the two departments have been asunder as the poles. The result has been that agricultural progress through the agency of unofficial associations has been nil, so that the central Agricultural Committee at Madras recently decided to draw itself closer to the co-operative organizations, in order that it may not be effaced. How to bring together the two orgainzations has been the subject of anxious consideration among the officials and non-officials interested in the two movements. Some practical conclusions appear to have been reached on the subject in a conference held recently by the Coimbatore agricultural association. It was there suggested that some attempt should be made to make use of the existing Co-operative Credit Societies for the purpose of agricultural improvement, in addition to the purely money business that they conduct already. The advantages were pointed out that in these Societies an existing organisation lay ready to hand, and that the members of those Societies were ordinarily of just the type we want, namely, prominent men animated by public spirit and a desire for progress. The more obvious dangers of such a course were at once pointed out by some gentlemen connected with the District Urban Bank (from which these Societies are largely financed) who said that co-operation in agricultural business was apt to be risky, and that there was a danger of Societies lowering their credit by such experiments. The matter was discussed for some time, and ultmately most of the members present were satisfied that such enterprises would be safe if the amount of money which Societies were allowed to spend in agricultural co-operation was limited to from 10 to 20 per cent. of their credit. It was considered reasonable that the Registrar of Co-operative Societies with the advice of the Agricultural Department, would be in a position to stop anything really rash or dangerous. It was formally agreed, therefore, that it would be a good thing for the Agricultural Assistant of the assoiation to interview the Panchayats of such societies and discuss with them the possibilities of useful agricultural co-operation.

An alternative proposal was also discussed, namely, that entirely separate Societies for agricultural co-operation should be started in addition to the existing Credit Societies instead of an attempt to graft agricultural co-operation on the latter. But the feeling generally prevailed that it was better to use the existing organisations instead of having two side by side. It was also suggested that Societies which adopted agricultural co-operation or which should hereafter be created for that purpose should be financed not by the District Urban Banks, but by the District Agricultural Associations. The general opinion was opposed to this, partly because it appeared better to have one co-operative organisation instead of two, and partly because it seemed hardly a legitimate activity of a District Agricultural Association to undertake banking business.

The Industrial World.

Cost of Production.

THE United States Consulate has been very busily engaged in recent years collecting statistics relating to various departments of trade, and one of the consuls has recently reported that all his efforts to ascertain the "*cost of production* of sundry manufactured articles have been met with a refusal on the part of British and German manufacturers to supply information which might benefit their competitors. Trade secrets which have been treasured by firms for years are not to be easily extracted. The varieties of treatment in the production of any manufactured article make the "*cost of production*" a variable quantity. Hence two firms, manufacturers of the same article, may differ considerably in their quotations.

The Watch Industry.

Watch-making is a fickle industry, to judge by Swiss statistics, published in the "*Econmist Francais*." For regular periods of three years each the industry rises and falls. From 1901 to 1903 it shrank from 5 millions to 4·3 millions sterling ; from 1904 to 1906 it rose from 4·8 millions to 6 millions ; from 1906 to 1909 it fell again from 6 millions to 5·02 millions ; since 1910 another rise has taken place, until in 1911 it had reached the record figure of 6·7 millions. In spite of vicissitudes a steady increase in production has been maintained, though the average value of each watch produced has diminshed. The reason assigned for the diminution of this average value is interesting. It is due to the exportation of extremely low-priced nickel watches for the English market, and also for British India. The only other country which provides any considerable market for such watches is the Argentine. Watches are commodity that Free Trade makes cheap.

The Silk Industry in India.

At a recent meeting of the Japan Silk Merchants Association held at Yokohama, Mr. Noma, expert of the Department of Agriculture and Commerce in Japan, delivered a speech concerning the silk business in India. He stated that in India, notably in Burma, Bombay and Calcutta, pure silk, silk and cotton mixed and silk and flax mixed are being produced, but with the exception of five factories, the enterprise is being carried on on a small scale and with hand-looms. The products exhibit much brilliancy, but business is dull, owing to the pressure of foreign products, especially Japanese. The reasons why the local industry is hampered are:—(1) It cannot compete with Japanese products on account of price; (2) raw material is not produced to a sufficiently large extent in India; and (3) cotton fabrics, which can only with difficulty be distinguished from silk textiles, are imported from England. The total value of the import of foreign silks into India is, according to latest statistics, Y.13,000,000, of which, material valued at Y.8,000,000, is from Japan, Y.2,100,000, from China and the rest from European countries. One-third of the total imports of India consists of goods from Japan, while one-third of the Japanse goods is silk fabrics. Silk fabrics are sought after by all classes of Indians, but the demand for them does not reach a great amount owing to the low standard of living. Having great convenience in ascertaining any change of taste in India, it is obvious that Japan will increase her export of silk goods to India, if suitable goods are despatched. With a view to manufacturing low-priced goods, it is advisable to use tamiato, gassed silk yarn, and artificial silk to make them appear of fine texture and strength ; otherwise, it is apprehended that Japanese goods may be beaten by silk satins and other silk fabrics of China. Mr. Noma also suggested the necessity of improving the method of carrying out transactions, inasmuch as the competition prevailing between Japanese merchants causes Indian traders some anxiety as to the danger

of engaging in transactions in Japanese goods. So acute has this become that the Indians now contemplate the formation of guilds to prevent losses from transactions in Japanese goods.

A New Method of Preserving Eggs.

Mr. Santolyne describes the new method in *Cosmos* thus :—

"The method consists of keeping the egg in an inert atmosphere of carbonic acid and nitrogen. . . . The eggs are placed in tin cases holding 500 each. These cases are then surrounded with two wooden frames, an outer one to enable the cases to be set in cold storage chambers, and an inner to facilitate the circulation of the gaseous atmosphere around the eggs. A little anhydrous chlorate of lime is placed within to absorb the moisture, and then the cover is soldered on, leaving a small hole about one-quater inch in diameter. The cases are then introduced into a horizontal receptacle in which a vacuum is produced, thus removing the air surrounding the eggs and the gases dissolved in their albumen. Then there is introduced carbonic gas previously heated. This is all done slowly, to enable the gas to penetrate into the egg, until the pressure gauge remains stationary. Excessive pressure is avoided, as it might be injurious to the eggs. With a vacuum pump a certain quantity of the carbonic gas is now removed and replaced with compress nitrogen. Then the cases are removed from the receptacle, a drop of solder is placed on the hole in the cover, and they are placed in cold storage at 35 degrees. It is unnecessary now to take care of the ventilation of the cold chamber or of the moisture of its air.

The advantages of this system, the author tells us, are as follows: "There is no evaporation at the surface of the eggs, no phenomena of oxidation, and no stale taste; they may be eaten from the shell even after ten months, and the albumen preserves the fine whitish tint that it has in fresh-laid eggs. The eggs may be kept some little time after being taken from cold storage before being delivered to the consumer. This is not the case with eggs preserved by cold alone. Bacilli, bacteria, and molds are killed by the cold and the gases, so that there are no moldy or decayed eggs and no loss. The cost is not much more than that of preservation by cold alone. The tin case, holding 500 eggs costs $1·60, and accommodation for 1,000 eggs, therefore, costs $3·20. These cases may last ten years. All told, the extra expenses come to about 40 cents per thousand eggs."

Uses of Aluminium.

We take the following extract from an article on the Aluminium Industry in India by Prof. P. G. Shah, M.A., B.SC., M.S.C.I., published in a recent issue of the *Modern Review*.

The large variety of uses to which the metal has been put in other countries will give an idea of the vast changes that are bound to follow with the increasing use of aluminium. The metal is at present used in all forms and dimensions, from papers, visiting cards, thimbles which weigh but fractions of a tola to objects of several maunds in weight such as ship-propellors and the like.

IN SMALL INDUSTRIES.

In the pure state aluminium serves for the manufacture of electric conductors, of surgical apparatus, precision instruments, of artistic objects like letter cases, picture frames, cigar cases, &c., and of cooking utensils, cups, dishes, pots, &c. For articles of small or moderate dimensions where no special strength is required, this metal competes successfully with copper, nickel, german-silver, and brass since volume for volume it is cheaper. In the larger industries also, aluminium is making rapid progress.

MILITARY USES.

It has been adopted for military uses, *e.g.*, field equipment utensils, where on account of its lightness a saving of about 50 per cent. in weight is effected ; again, the gun carriages used in France are made of this metal which weigh only 78 kilograms instead of the usual weight of 285 kilograms.

USE IN STEAMERS.

Yachts and steamers have been made of this metal with considerable saving in weight.

CYCLES, MOTOR CARS.

Aluminium permits of being worked into tubes which are preferred in the chemical industries, in optical instruments, and in the making of cycles, motor cars, etc.

AEROPLANES.

It need not be pointed out that the science of aeronautics and the making of aeroplanes have been facilitated by the use of aluminium and its lighter alloys.

ELECTRIC WORKS.

Aluminium has a bright future before it as a conductor for electricity ; though it is not so good a conductor as copper, on account of its lightness, with equal conductivity it weighs and costs less than copper. As such, it is already in large use for overhead electric transmission.

IN MINING.

In the mining industry there has been considerable saving in time, cost and energy by the use of aluminium cars and cages.

IN SURGERY AND DENTISTRY.

In Medical Science, the surgical instruments have been made lighter and more handy, while its use in the dental plates has reduced both the cost and weight of artificial teeth.

IN SCIENTIFIC APPARATUS.

In the manufacture of scientific instruments of precision like the Balance, the Sextant, &c., lightness as well as resistance to atmospheric oxidation have been secured. It has been found useful for the manufacture of ordinary chemical apparatus like ovens, baths, tripods, etc. ; while in chemical industries it has been a great boon as it is fairly stable towards common chemical agents. The recent developments in the art of soldering aluminium has made this metal more easily available for the larger plants required in the chemical industries. Aluminium is a good chemical agent for reducing the oxides of many metals and these reactions are utilised in various ways.

IN FLASH LIGHT.

The use of aluminium in flash light powder is likely to change the old methods of lighting entirely.

IN PRINTING.

For printing purposes it is found useful, lithographic plates made out of the metal, being very valuable.

IN COINAGE.

On account of its lightness and stability in air, it has been proposed for coinage in place of copper and brass.

A SEMI-NOBLE METAL.

Aluminium is very slowly acted upon by acids, though alkalis and salts have greater action. Aluminium has been styled for this reason a semi-noble metal being intermediate between the noble metals—silver, gold and platinum, and the base metals—iron, copper, zinc, lead, etc. As such,

" This semi-noble metal has immense future before it, because, silver, gold, and platinum have extremely small prospects of being noticeably cheaper, yet the time is not probably far distant when we shall have this metal at the price of the base metals. It can replace platinum and gold because of its lightness ; it already replaces silver, specially because of its resistance to sulphur, as well as of its lightness, besides being cheaper. At its present price it can replace the common metals for uses where its lightness is an extraordinary advantage. But when its price is down to that of these baser metals, it will replace them by virtue of its own intrinsic chemical and physical superiority, aside from its lightness. According to the calculations made in 1895, four metals, iron, zinc, lead,and copper were cheaper than aluminium bulk for bulk."

" The ultimate goal of aluminium industry will be reached when it outstrips any of these metals and stands next, in importance and value of annual production, to iron."

IMPORTANCE OF THE DISCOVERY OF ALUMINIUM.

In the light of these uses and possibilities of the metal it is no exaggeration to say that the discovery and the cheapening of aluminium is one of the greatest achievements of the nineteenth century ; in other words,

" Nineteenth century will live in history as that century which gave to the world, the

railway, the telegraph, the telephone, the dynamo, the Bessemer steel and aluminium."

Out of several uses of the metal enumerated above, we are not concerned with any in India except the use as cooking materials. It will take perhaps a long time in India for the application of aluminium to other purposes, as the workmen are not yet quite familar with the methods of working the metal.

CULINERY PURPOSES.

As a material for making cooking utensils and the like, the superiority of aluminium is established, as the most useful and least attacked of the ordinary metals, by means of experiments conducted ever since the metal was familiarised in the fifties of the last century.

The Dearness of Raw Hides.

Various explanations have been proffered to account for the present extremely high value of raw hides and skins, and apart from the generally accepted theory that the demand for leather keeps fairly well equal to the supply, there are, according to the *Leather Trades Review*, other and deeper reasons which are worth close examination. A permanent industry of rearing animals merely for their skins has not yet been initiated; at least, not in the case of any of those animals which provide skins for leather manufacturing purposes. The supply of raw material is therefore limited to the extent of the meat trade, of which the by-product, hides and skins, which have become more precious than ever before, ought to be preserved in the best possible condition for the tannery, while the leather made from them should be of good quality, if the best and most economical results are to be obtained. Unfortunately, these conditions only exist to a very limited degree. In the first case, very little more attention has been given, in practice, to the preservation of hides and skins than was given, say, half-a-century ago. There are almost as many hides cut in flaying as ever there were, although the Irish hides are a notable exception and have been improved consideraoly in this respect. It can scarcely be said there is any marked improvement in the warbled condition of hides; in fact, some observers have even asserted that warbles were more numerous than ever after the dry summer of 1911. Neither can it be said with any degree of accuracy that the cleanliness of hides receives much attention in these days, and we are now approaching the season when some of the hides of stall-fed beasts will be found with as much as 10—12 pounds of dirt on them, and probably with the grain damaged in consequence, although, with a little more care, the hides on the live beasts could have been kept perfectly clean. The bad condition of English hides from now to the end of the year is usually allowed for by the slight reduction in price of, perhaps, $\frac{1}{8}d.$ per lb., but very often the hides, especially those that are very dirty and wet, are worth at least $\frac{1}{2}d.$ per lb. less than at other times of the year.

The second great cause of the high price of raw hides is undoubtedly due to the over-production of a cheap common leather. Unlike many other industries, leather manufacture depends for its raw materials on a by-product, and it is a self-evident, economical fact, that if the demand for this by-product is unduly inflated by the manufacture of a large proportion of cheap shoddy leather, the price of the raw material will steadily advance until finally the result is obtained that has been foreshadowed by so many experts in the leather trade, *viz.* :—That the so-called cheap leather of to-morrow will actually be higher in price than the very best leather made a decade ago. It is for this reason that the suppression of the use of all weighting adulterants in leather is so desirable, but it will be difficult to get rid of this practice entirely while leather is sold on the basis of weight. At first sight it would appear that the method of loading leather with cheap chemicals would defeat its own object, especially when the leather is carefully costed by the user. Apparently, the buyer has to pay not only for the leather, but also for the weighting material and for the time and trouble taken in its incorporation into the leather. Indeed, one prominent authority on the leather trade recently gave certain figures

to prove the fallacy of the system of weighting and expressed the opinion that some shoe manufacturers failed to stock out their leathers properly; in fact, his figures appeared to prove the *reductio ad absurdum* policy of weighting. Unfortunately for that argument, all the boot manufacturers cannot be wrong all the time, and if the leather is not very carefully stocked out in some of the smaller shoe firms, the same remark cannot be applied to the majority of manufacturers, who make a complete record of the use of every lot of leather that comes into their premises, and, judging by their keenness in the important matter of costs, we should be inclined to think that their stock-sheets are generally accurate. The fact remains that there is some justification for using weighting materials so far as concerns the cost of production; for, unfortunately, the various chemicals used are very much cheaper than tanning materials which they largely replace in the common weighted leathers. The hides are frequently somewhat undertanned, in which condition they absorb a much larger quantity of weighting materials. These salts are soon washed out of the leather when in wear, and the under-tanned condition is then revealed by softness and sponginess due to insufficient tannin, and the rapid absorption of water. It is against such treatment and such waste of raw hides that active measures should be taken. As regards the weighting of sole and other leathers with surplus tannin matter, this would be rendered unnecessary by the adoption of the method of selling leather by measurement instead of weight. Dressing leathers could be struck out by machine before being dried out in order to facilitate measuring.

But substituting measurement for weight will be no remedy for those cases where leather is adulterated with cheap hygroscopic salts with the view of economising in tanning materials. In any case, where the supply of raw material is limited, as is unfortunately, so largely the case in the leather trade, it is obviously more economical to produce a good, sound, durable article than one which is quickly worn out. Had such conditions been universal during the past few years, hides would never have reached their present value, notwithstanding the increased number of uses for leather. A cheapening of the cost of raw hides in the future, and a corresponding lower price of the finished sole leather can be looked for in the future only by the production of a more durable and serviceable article than is found in too large a proportion of modern leathers.

The Lubrication of Machinery.

Mr. Walter J. May, writing in the *English Mechanic and World of Science*, points out that to provide for the proper lubrication of machinery of any kind, two things are necessary—suitable oils or greases, and efficient lubricators fitted for the positions which they are to occupy, and also fitted to maintain a supply of the clean lubricant. To supply a mixture of oil and dirt to any machine is likely to cause serious injury, and often to supply an unsuitable lubricant is to get hot bearings or seized journals, points to be carried in mind at all times.

The object of lubrication is to place a film of oil or other suitable material between the surfaces of the shaft and bearing, or between two moving surfaces, so that instead of the metal being in close contact, and so grinding away, they will be sliding on the lubricant. This in itself makes a careful selection of the oil, grease, or other substance used, a matter of considerable importance; because, if one used a light cycle or sewing-machine oil in a heavy machine it would not carry the weight, the moving surfaces then simply coming into contact. Equally, if we use a heavy oil or grease in a light machine it will either not spread properly, or it will retard the machine, owing to its resistance. Any form of lubricant which has a chemical action on either one or both of the surfaces to which it is applied should be avoided, and in the case of oils and greases used in steam cylinders it is important that their action onthe boilers should be considered where the exhaust steam is condensed and the water again used.

The majority of things which have to be

lubricated require a constant, although small, regular supply of whatever material is being used, it being insufficient to pour down a pint of oil in the morning and then forget all about the matter for the rest of the day. Where such a practice obtains, there is a continual demand for liners and new brasses, and the results are generally of an unsatisfactory character. This applies also to greases and solid lubricants generally, and unless the supply is constantly replenished, something has to suffer.

There are a good many devices to secure a regular supply of lubricant to bearings, some of the appliances being very ingenious ; but unless some form of forced feed be used, there is always a doubt as to the efficiency of the work being performed. Some of the appliances used are also very liable to fail from very trivial causes, and damage is easily done before it is noticed where such happens to be the case, because the men in charge of machinery are apt to trust too much to the automatic working of such appliances, and thus unconsciously neglect what they would pay particular attention to if the weak appliances were not in use. Even the bottle and needle lubricators need closely watching, unless they are on absolutely clean bearings, as a very little will obstruct the flow of oil and permit the bearings to become dry, or nearly so. With a forced feed, while the apparatus is in motion the lubricant must flow to where it is directed, while in the event of the apparatus failing to work, such would be more readily seen than where a simple automatic action would be noticed—points worth attention. Forced feed can be applied to both solid and liquid lubricants, and in nearly every position. Even colliery tram wheels, conveyor rollers, and such like things could have a forced-feed lubricator of simple design fitted to each one separately, the labor of keeping such lubricators charged being very small, while the grease saved would pay for their cost in a very short time.

In dusty and otherwise dirty places, the question of lubrication is usually a difficult one, as it is one of the hardest things in running a mechanical business to insure cleanliness in any place not in full view. The oilers will not clear away the dirt before squirting oil in and around the oil-holes, and in most cases, on opening the bearings it will be found that the channels are filled with dirt, and what little oil reaches the bearing is so mixed with grit that it does quite as much harm as good. Of course, in dirty places it is necessary to be specially careful; but there is no real difficulty provided cleanliness is an imperative duty. There should be a rule made and adhered to that the accumulated dirt be removed before oiling, and some little care may also be taken in providing small—and, possibly, home-made-appliances for the throwing off of dirt from the bearings as much as possible, while automatic scrapers should remove exuded grease and dirt from the shafting and ends of bearings, these being easy to design and make where there is a workshop on the place. Preferentially, forced-feed lubricators should be used wherever possible, as these can be obtained to give a positive supply of either oil or grease, as desired, and if well arranged the dirty stuff from the bearings will work out at the ends and be scraped off, so that all dirt will be kept out of the moving parts of the machinery. Some things are difficult to deal with anyhow, as, for instance, the bearings of the bottom sprocket of an elevator working in a boot on wet, gritty material; but, of course, such cases are not general, and only affect a few trades.

Dry lubrication can be used with a good many things, either plumbago or steatite being used, and in regard to this some little skill has to be exercised. Either the lubricant can be used absolutely dry or mixed with just enough tallow to prevent it from flying about: which method is best being very much dependent on local conditions. The object is to obtain as little friction as possible, and to do this two polished surfaces are necessary, and to these must be added a greasy working lubricant such as those mentioned, with or without some greasy adhesive to prevent them from blowing away. Where it does not matter about the

dust it is better to do without the adhesives; but where tallow is used, the smallest amount possible to effect its purpose should be used, and to facilitate the work of mixing, the tallow should be melted and the lubricant warm.

In some cases the dry lubricant can be best used in the form of a pencil or bar after being agglutinated together with tallow or some other medium, the bar being made to slightly rub the surface over which it passes by means of an adjustable feed; but in this case the special requirements of each case will have to be arranged for. In any case, after the surfaces are once lubricated, only a small quantity of lubricant will be needed to keep them in good order, and for this reason very careful adjustment must be made.

New Sources of Paper.

In the course of a long paper on the above subject, read before the Royal Society of Arts, Messrs. Clayton Beadle and H. P. Stevens, say that paper-makers had up till recently taken it for granted that the supplies of pulp-wood, were inexhaustible But the paper trade is waking up to the fact that pulp-wood is getting scarce and that prices are rising in consequence. Half a century ago esparto grass and spruce and poplar woods were found to produce excellent paper fibre. Also hundreds of vegetable fibres of different kinds have been tried since and the great bulk of them have shown little or no prospect of commercial success.

Attempts are now being made to utilise the waste wood. It is stated that in 1910 in the U. S. A. $6\frac{1}{2}$ per cent. of the total consumption of pulp-wood was derived from "*Slabs*" and mill waste. New kinds of wood such as aspen, beech, cotton gum, Douglas fir, cedar, jack and other allied pines, red alder, sycamore, hemlock and fir, are now sought to be utilised by the forest service of the U. S. A. Department of Agriculture in the making of paper. The attempts have been successful with many of the trees, and the paper produced from the hemlock and jackpine is said to possess the strength, finish and appearance of the standard newspaper.

Mr. Thomas Routledge, the esparto-pioneer, say the writers, in 1875 demonstrated that the bamboo was a good source of supply. But, since then, nothing very encouraging was heard about bamboo up till 1905, when the Government of India decided to make extended enquiries and appointed Mr. R. W. Sindall to visit Burma for making investigation on the spot.

More recently Mr. W. Raitt, expert to the Imperial Forest Research Institute, Dehra Dun, made very extensive researches, and as a result, a very voluminous official report was published, the summary of which, giving the cost of treatment for the production of unbleached bamboo pulp is interesting.—

	Rs.	A.	P.
Bamboo	27	8	0
Chemicals	29	44	0
Fuel	17	4	0
Labour and Superintendence	7	0	0
Depreciation and repairs ...	6	5	0
Royalty	1	0	0
Insurance, taxes, stores and sundries	3	9	0
	92	8	0

or say £6 3*s*. 4*d*. per ton of 2,240 lbs.

"Should it be necessary to produce a bleached plup, the cost will be, for a fully bleached article, Rs. 125 per ton, inclusive of the loss in weight caused by bleaching."

In spite of certain difficulties which still have to be contended with, the treatment of bamboo is very attractive to the British paper-maker, on account of the abundance of bamboo in the British Empire.

In spite of strong opposition and prejudice on account of early failures since 1887, *Cotton-seed cotton* is now shipped from the Southern States of America to Europe where it is boiled, bleached and used in the manufacture of the highest class papers.

Baggase, the refuse of the sugar-cane after the juice has been expressed, is another source which is being tried out altogether without success. There is a strong case made not by the U.S. Department of Agriculture in favour of hemp as a possible source, for the manufacture of special papers, such as India paper.

The writers then refer to *Hedychium coronarium*.—"To bring to the notice of those interested in the trade the possibility of actually cultivating crop-plants for the manufacture of paper is indeed the chief object of this communication, and with a view to showing what might be done in this direction, we wish to describe in considerable detail the work which we have recently done in connection with *Hedychium coronarium*. This plant is a member of the natural order *Zingiberaceæ*, and is a native of India, being distributed from the Himalayas to Ceylon and Malacca, ascending

to 4,000 ft. in the Khasi Hills and 6,000 ft. in Ceylon."

The fibre of this plant is said to possess some peculiar paper-making qualities Where this plant is particularly abundant, and where circumstances favour the cultivation of the plant, its stem at butt end varies from 1 to 2 inches in diameter, grows to a height of from 3 to 6 feet, with 100 to 150 stems per square metre, and the weight of the entire plant with leaves is from 400 to 600 grams per stem, with, say, an average of 1 lb. each.

Say the writers ; " Several times we have taken the green stems and made paper, and have arrived at the conclusion that where the ground is properly covered (stems 4 inches apart) with plants even of the size obtainable under glass in this country, the yield would be 7 tons of raw dried fibre, equal to 4 tons of paper per acre per annum.

" The plant, after harvesting and crushing between rollers to remove juices, can be immediately beaten in Hollanders and made into paper. With a mill conveniently situated to the sources of supply, so that the operations could be carried on without loss of time, the whole treatment, from harvesting to the manufacture of paper, need not occupy more than a space of twenty-four hours.

" The ease with which the stuff is beaten surprises us. For the production of strong papers from most paper-making materials, a great deal of beating is necessary, but as *Hedychium* is easily reduced to a pulp with gentle "brushing," this is certainly a feature in its favour.

"Paper produced entirely from this fibre has been submitted to a large firm of cable manufacturers and thoroughly tested, both physically and electrically, and declared to be suitable for cable insulation. Hedychium paper, therefore, appears to rival the best Manila papers in the possibility of its applicatiou for the special purposes to which Manila is put, as well as being applicable for all ordinary purposes, and can be used either alone or in conjunction with other materials, either bleached, unbleached, or partly bleached.

" It is interesting to compare the breaking length of fibro-vascular bundles, such as Manila and *Hedychium*, with that of the strongest papers which have so far been produced from these fibres. Taking the strength of the papers in the running direction, we sometimes get a breaking length of 12,000 metres with *Hedychium*, or an average of 10,000 in the two directions. This is only a fifth part of the breaking length of the fibro-vascular bundles, but we think it is about the highest figure ever recorded for a paper."

The writers have given a tabular statement showing the materials that might become available for the manufacture of paper in the future.

Table showing Materials that might become available for the Manufacture of Paper.

	Acres under cultivation.	Tons per acre per annum of dry raw material.	Tons of raw fibre per annum on total area.	Percentage yield of pulp on dry raw material.	Tons of pulp per acre per annum.	Tons of pulp per annum on total area.
Cropped once a year.						
1. Corn-stalks	30,000,000	1·0	30,000,000	12-18	0·12	3,600,000
2. Broom corn	178,584	3·0	450,000	32-40	1·00	150,000
3. Rice-straw	720,000	2·0	1,500,000	35	0·70	500,000
4. Flax-straw	2,000,000	1·0	2,000,000	30	0·30	600,000
5. Cotton-hull fibres ...	...	...	150,000	75	...	112,000
6. Cotton-stalks	10,000,000	0·45	4,500,000	35-40	0·15	1,500,000
7. Hemp-straw	...	5·0	...	20	1·00	...
8. Hedychium	...	6-10	...	60	4·00	...
Cropped every 5 years.						
9. Bamboo (Pearson, Sindall)...	...	$\frac{15}{5}$	..	45	1·35 to	...
10. Bamboo (Pearson, Raitt) ...		$\frac{8}{5}$ to $\frac{18}{5}$	...	45	1·57	...
Cropped every 40 years.						
11. Pulp-wood	...	$\frac{16 \text{ cords}}{40}$	...	45	0·20	...

The Commercial World.

Indian Weights and Measures.

THE question of the unification of Indian weights and measures is now attracting a good deal of attention. The movement for reform proceeds in many cases from the Indian community and certain Local Governments are taking steps to study its possibilities afresh. The Government of India will shortly appoint a committee of enquiry and the *personnel* of the commission is now under consideration. Meanwhile the Director-General of Commercial Intelligence has, in connection with this question, procured from all the Local Governments and Administrations statements showing the several weights in use and the extent of the territories in which they severaly prevail. Since the *ser* is evidently the base of all the systems an analysis of the statements, relating to *sers*, has first been made, and it appears from the analysis that out of a total number of 235 *sers* in use in India 192 *sers* are for weighing and measuring grains and range from 19 tolas (·222 kilos, or 7·817 oz.) to 168 tolas (1·959 kilos or 69·115 oz.). It seemed unnecessary to carry out any elaborate analysis regarding the extent to which use is made of the less common *sers* and attention was centred on those *sers* most generally employed. A statement showing under each of the more prevalent *sers* for weighing and measuring grains the number of people in such districts of the several provinces as use it has been prepared and will be published in the next issue.

Commercial Enterprise in India.

The business enterprise in India during April 1913 is shown by the following abstract of Joint Stock Companies registered in that month:—

		Rs.
7	Banking and Loan Companies	2,58,00,000
1	Insurance Company	5,00,000
1	Navigation Company	50,00,000
1	Railway Company	20,00,000
1	Printing, Publishing and Stationery Company ...	5,00,000
7	Trading Companies (other than specified above) ...	32,27,000
1	Jute Mill Company	37,50,000
1	Rice Mill Company	96,000
1	Oil Mill Company	1,00,000
2	Tea Planting Companies ...	3,50,000
1	Planting Company (other than specified above) ...	10,000
1	Coal Company	80,000
1	Mining and Quarrying (other than specified above) ...	6,00,000
1	Company (other than specified above)	3,00,000
27	Grand Total ...	4,23,13,000

Demand for Scissors and Shears.

Some interesting particulars of the demand for scissors and shears are contained in several recent American Consular reports. Most countries, the United Kingdom included, classify these goods in their import trade returns under the generic heading of cutlery, hence the actual volume of trade is rather difficult to ascertain. In Norway, however, no scissors are manufactured, and the importation is quite considerable. The chief countries of supply are Britain, Germany, Sweden, and the United States. The terms of sale are usually one to three months, with 2 per cent. off for prompt cash. Wholesale prices of 6-in. scissors average, per dozen, German 7*s.* 3*d.*, English 7*s.* 9*d.*, and Swedish 8*s.* Tailors' shears range from 5*s.* 8*d.* to 17*s.* 10*d.* per pair. The retail prices per pair are, roughly, ladies' small scissors 1*s.* to 2*s.* 3*d.*, ordinary sizes 2*s.* 9*d.*, and tailors' shears 9*s.* 4*d.* to 20*s.* Southern India is also a profitable field for the sale of scissors, as in addition to the large domestic

demand there are, in Madras alone, over 11,000 tailors, dressmakers, and so forth, in addition to 3,400 barbers and hairdressers, all of whom are potential customers. Of shears Great Britain sends slightly more than the United States, while in scissors Germany is easily first.

An Indian Commercial Congress.

Sir Fasulbhai Currimbhoy has written a letter to the *Times of India* suggesting the establishment of a separate commercial congress. He says :—

One of the most prominent and gratifying signs of the times is the rapid growth of interest amongst Indians in matters concerning commerce and industry. As was expected, the extravagant and impracticable features of the Swadeshi movement, as it was conceived by some of the less responsible leaders on the Bengal side, have evaporated in the light of commonsense and experience. What is left, is a solid deposit of sober and thoughtful ambition to take such steps as will enable the material resources of India to be utilised to the greatest advantage of the community at large.

There is also a growing appreciation of the truth that the resources of a country, both material and moral, belong of right not only to the persons who happen to inhabit that country but to humanity. The Indian people are thus responsible to the civilised world for the use to which they put the great opportunities made available by the peace and educational facilities secured to them as part and parcel of the British Empire.

This increase of interest in trade and industry is reflected in several organisations, some well-conceived, others inspired more by enthusiasm than by knowledge, designed to stimulate industrial and commercial activities. Several new journals and magazines have been started within the last few years, specially devoted to such subjects as commerce, industry and co-operative methods. There are also some journals specially devoted to the great agricultural industry. Indian Chambers of Commerce have been established in the important towns of India. Government have recognised the claims of the Indian commercial community to representation in the Provincial and Imperial Legislative Councils. The National Industrial Conference has been held for the last several years, and Provincial Conferences are being held annually on the same lines.

The time is now come, in my opinion, when an earnest effort should be made to consolidate all these activities in a common, well-thought out and well-directed movement. I, therefore, wish to suggest, through your columns, to Indian commercial men and others interested in trade and industry, the holding of a Congress of Commerce and Industry. The sittings of the Congress may at first be limited to once in two or three years. Representatives of all interests affecting the economic prosperity of India will be welcome. In course of time, this Conference can take over the Industrial Conference now held in connection with the National Congress. A Congress such as I suggest will direct opinion in sound and practicable channels, and will, moreover, be a useful medium of communication between the Indian commercial community and the Government of India.

In view of the expected important developments in the commercial and fiscal policy of Great Britain in relation to its Colonies and Dependencies, the importance of the existence of a recognised organ of Indian commercial opinion cannot be exaggerated. It will speak with authority and emphasis on behalf of Indian interests in the Councils of the Empire, and its representations must carry weight. I trust that this suggestion will be taken up by the Indian press and leaders throughout the country, and discussed with a view to an early decision. If necessary, a conference of leading men can be arranged to take place in the next few months at Delhi, Bombay or Calcutta.

Commercial Agencies in Foreign Countries.

Mr. R. Palit, late Editor of the *Indian Economist*, contributes an article on "The Value of Commercial Agencies in Foreign Countries"

to the May number of the *Hindustan Review*. After describing the useful functions which a merchant discharges in every country as the necessary auxiliary, friend and guide of the producing classes, he mourns the fast sinking of the Indian merchant all over the country. This is due to the lack of special education of the Indian merchant, unlike his compeer in Europe and America.

He does not possess any adequate grasp of his position and functions in the economy of his country's industrial life, and therefore he fails, to do the work which is his, and render the help he should to the industrial class in the country. He has little or no hold on foreign markets and his share in the foreign trade of the country is now a vanishing quantity—*barely 10 per cent. of the total volume.* The shipping employed in the commerce of the country is almost entirely foreign. The internal trade of the country is also passing from under his control. The consequences of this almost total failure of native commercial enterprise are, according to the writer, ruinous in the extreme. Apart from the economic losses, which are no doubt serious, the moral injury done is more serious still. While each nation has its trade under its direction and control, India alone has had to resign into other hands the direction of her commercial intercourse with foreign countries, with the result "that a whole nation is driven to the plough – 86 per cent. of the immense population of the Peninsula living on the land alone."

Again, "the decadence of Indian Art is directly attributable to this cause." Mr. Palit would therefore provide a proper training for the Indian artizan. "He will then know how to serve his country and hold his own against all rivals. Leave him to grope in his present helpless ignorance, and nothing can save him or the industries of his country from the threatened collapse."

Mr. Palit also points out how the business of the native merchant is undergoing steady contraction. He says :—

As to our position in industrial activity, 40 or 100 years ago, of course no statistical returns are forthcoming ; but historians say —Elliot among others,—we had extensive commercial intercourse with all the countries of Upper Africa and Assyria, and much of our trade was then in the hands of the natives of the country—of course Mahomedans included, particularly in the finer products of the countries.

After the establishment of British rule, much of the trade failed. But for some years, the export sea-borne trade which thus sprung up was in our hands and gradually it has passed or is passing now into other hands, I mean in respect of transport goods from the interior to the coast.

If we look to inter-provincial trade, we have the same phenomenon to note. In former days, there was a good deal of this sort of inter-provincial intercourse even in the ordinary absence of means of communication. Now, in spite of railways, etc., this trade is diminishing and it is now barely, export and import together, 24 crores for all India including Native States, the foreign trade averaging 195 crores.

The obvious remedy for this state of things is "to provide the necessary training, create the needed supply of training, disciplined skill, and scientific knowledge and resource—and then the native merchant will know how to increase his business, or—in other words, to cope better with the foreigner. Thus, though there is at *present* curtailment of our business, there is the prospect—the almost assured prospect—of largely augmenting it. The help needed is the help of a class of commercial trained men, who can know better how to deal with the situation."

"We know it is useless to expect to succeed in establishing our own firms in England, and elsewhere all at once. But we can make a humble beginning by establishing co-operative concerns that can import direct from manufacturing centres. In our own province there is large business done in sheet metals, in drugs and medicines, in paper of various kinds and in several other articles of daily use. Let endeavours be made to induce merchants

to establish co-operative concerns for whole import direct from manufacturing centres, and the realization of our ideal of establishing native agencies will be a step nearer. These firms can afford to send out agents who can ascertain which market is the cheapest to buy from, and what banking and other facilities for a direct trade exist there. Information on these and similar points is necessary before an agency can be established, and when that is obtained, it will not be very difficult to make arrangements to establish houses."

The Import] Trade of India.

This section of India's sea-borne trade forms about 40 per cent. of the whole. Its value in 1911-12 was Rs. 138·57 crores, which was a record, but in the year under review it has risen to Rs. 161·01 crores. The advance of Rs. 22·44 crores represents 16·2 per cent. on the previous year's figure; and the total exceeds the record of 1907-08 by 31·01 crores.

FOUR CLASSES OF IMPORTS.

The four classes in which the articles are now grouped are :—(1) Food, drink, and tobacco; (2) Raw materials and produce and articles mainly unmanufactured; (3) Articles wholly or mainly manufactured; and (4) Miscellaneous and unclassified goods.

Of these, the third class "articles wholly or mainly manufactured" contributed the largest sum. It formed 76·4 per cent., of the total, and its aggregate increased by Rs. 18·12 crores, or 17·3 per cent. The principal items and their percentages of the total of this class were: yarns and textile fabrics 56 per cent., metals 10·6 per cent, railway plant and rolling stock 5·2 per cent., and cutlery, hardware implements and instruments 4·4 per cent.

In the first class, "food, drink, and tobacco," which represented 14·5 per cent. of the total imports of merchandise, there was an increase amounting to Rs. 2·98 crores, or 14·6 per cent. The principal items and their percentages of the total were: sugar 61 per cent., provisions 10 per cent., liquors 7·7 per cent., and spices 6·9 per cent.

The second class, "raw materials and produce and articles mainly unmanufactured,' formed 7·7 per cent. of the total, and it advanced by Rs. 1·31 crores, or 11·9 per cent. The principal items and their percentages were, textile materials 34 per cent., oils 32·1 per cent., and coal coke and patent fuel 9·4 per cent. There was a fall of Rs. 43·53 lakhs, or 9·8 per cent., in the imports of oil.

The fourth class, "miscellaneous and unclassified," represented 1·4 per cent. of the total and showed an increase of Rs. 2·56 lakhs, or 1·1 per cent. resulting mainly from larger importations by post.

RAW COTTON.

The imports of raw cotton continue to increase. In the year under review, the increase was less marked than in 1911-12, but it is still considerable and is symptomatic of the trend of the Indian industry towards finer products. It has of course been stimulated by the relatively high prices current for good Indian cottons. The imports amounted to 548,071 cwts. and Rs. 222 39 lakhs in place of 482,795 cwts. and Rs. 208·64 lakhs. The net increase is, therefore, one of 65,276 cwts or 13·5 per cent. in quantity and of Rs. 13·75 lakhs or 6·6 per cent. in value. In American cotton alone the increase is enormously greater. Imports from the United States rose from 103,385 to 249,769 cwts. the increase being 146,384 cwts. or 141 per cent., but this was offset to the extent of a net 81,260 cwts. from Europe. Arrival from the United Kingdom fell from 323,676 to 235,813 cwts. and those from Austria declined from 5,700 to 740 cwts., while Germany increased her contribution from 22,156 to 25,109 cwts. and that of Belgium rose from 2,294 to 11,598 cwts.; Egypt supplied 8,621 cwts. in place of 5,803 cwts. but most of the other sources showed contraction. Asiatic Turkey sent only 6,289 cwts. in place of 7,763 cwts., and Persia's share fell from 5,510 to 3,950 cwts.

SILK.

India's imports of raw silk now exceed her exports by 1,900,996 lbs. or 113 per cent. In 1912-13 the imports grew from 2,239,105 to

3,578,837 lbs. with a value of Rs. 171·45 lakhs. The increase of 1,339,732 lbs. marks an addition of 59·8 per cent. to the total quantity; and the expansion of Rs. 65·47 lakhs in value amounts to 61·8 per cent. Of the total, Bombay at Rs. 133-33 lakhs took 64·5 per cent. more than last year, and Burma increased her purchases to Rs. 31·44 lakhs. Direct imports from China at 3,317,268 lbs. showed a great increase on the previous year; but Japan's figure further declined from 50,916 to 8,471 lbs. Receipts from the Straits Settlements, at 106,377 lbs., showed a decline of 51·8 per cent.

COTTON GOODS.

On the average of the last three years, cotton goods have represented 47·6 per cent. of the total value of manufactured articles imported. The American cotton crop of 1912 was large, though short of that gathered in 1911; and but for the extraordinary activity of the demand for material and products, prices must have declined substantially.

SUGAR.

Sugar retains its position as the second article in order of importance in any class of imports. The quantity of foreign sugar retained for consumption in India in the last two years has been 8,234,000 cwts. in 1911-12 and 13,152,000 cwts. in 1912-13. The imports of sugar of both kinds together advanced by 3,358,500 cwts. and by Rs. 237·83 lakhs. The increase amounted to 33·1 per cent. in quanity and 21·2 per cent. in value, making a fall of 9 per cent. in the average value per unit. The import of cane sugar rose by 25 per cent. The greater part of the increase in quantity is traceable to the development in the imports from Java and Mauritius. In refined sugar, Java greatly surpasses any other source of supply. Having regard to the notable trend towards superior sugars in the Java industry, it is well to keep tale of the fact that in the last five years the proportion of refined to total sugars received from Java has risen from 88 to 98·6 per cent. and Mauritius, another cane country, came second. Austria-Hungary, though taking the first place as a source of beet, comes third in refined sugar.

INDIAN SUGAR GROP.

The Indian crop gathered in the beginning of 1912 was a good one. A systematic effort to place the Indian Sugar industry on something like a modern footing has been initiated and has stimulated planting, with the result that the crop gathered in the beginning of 1913 is believed to have exceeded the previous year's figures by 5·6 per cent. in area. The figures relating to cane comprise only those tracts that make returns of cane cultivation, but there is reason to believe that India now produces about 3,000,000 tons of cane sugar. This is about one-third of the world's recorded cane crop and makes India the largest single producer. Cane sugar, including that of India, represents about 49 per cent. of the world's total sugar supply. Yet India bought over 9 per cent. of the cane sugar external to India in 1912-13 and 91·5 per cent. of the sugar imported into the country was cane sugar.

The Packing of Merchandise for the Tropics.

An interesting report on the subject, prepared by the United Sates Consul at Bombay, is reproduced below:—

One of the earliest experiences of most exporters who send goods to tropical countries is an unexpected loss which is traceable to the influence of a climate with which they are not familiar. The effect of the climate must be considered apart from all other risks due to accidents or violence, and they may be summed up under the heads of heat, damp and vermin. Moisture as existing in the air of Bombay is very favourable to the growth of mildew in leather, paper, or manufactured goods. It quickly tarnishes metals and renders cooked foods unfit for consumption in a few hours.

Many industries are completely stopped in India during the wet weather, mainly on account of the lack of proper appliances for drying. Tile-making, for example, is always stopped during the monsoon, and the cigar industry seems to have failed in Bombay

largely through the absence of proper drying apparatus for absorbing the moisture that had been imparted to the leaf and render it adaptable to machine manipulation.

DATA FOR SAFEGUARDING MERCHANDISE.

In a pamphlet, published by the *Indian Textile Journal* of Bombay, the following is stated regarding the effect of the Indian climate on different manufactured articles:—

The rainfall in India, which all takes place within four to five months, contributes largely in giving to the climate its peculiar character. Averages at various cities follow: Bombay 72·25 inches; Karachi, 7·34 inches; Hyderabad (Sind), 8 inches; Nagpur 45·09 inches; Allahabad, 38·51 inches.

The effect of heavy and continuous rain in the tropics is to produce a dampness in the air quite unknown in Europe, and which is very destructive to many articles of European manufacture. The moisture and heat combined set up all kinds of fungoid growth and decay in goods, which are quite unaffecfed by the climatic conditions of Europe. Mildew attacks textile goods, leather, books and stationery; arms, cutlery and metal work require constant supervision to preserve them. European furniture of wood is soon spoiled by swelling and shrinkage, or by borer worms; and liquors, excepting the strong alcoholic ones, rapidly deteriorate in the heat of India. Perishable goods soldered up in tin-lined cases are not safe, if they have been packed in Europe in wet weather. The heat of the ship's hold in the Red Sea, or that of a closed iron wagon on the Indian Railways, when the iron may acquire a temperature of 160 degrees in the sun, will start mildew in the case by the aid of the moisture within it. Straw and shaving packings hold a good deal of moisture in damp weather, and do much mischief when sent to the tropics. No merchandise, therefore, that is liable to injury from heat or moisture can be stored long in India without serious deterioration.

BOOKS.

Books if bound with ordinary paste are quickly attacked by mildew and by vermin. Beetles will eat off the surface finish from stamped cloth covers. The paste should be mixed with corrosive sublimate or other antiseptic. Books on shelves, unless packed tight, are all hanging by the binding and a warm, damp atmosphere loosens them from the covers if they are large. All large books for use in the tropics should be bound so that when placed upright on a shelf the leaves should rest on the shelf, that is to say, the covers should be cut flush with the leaves on the under side. The appearance of such a volume might provoke criticism, but it would never lose its cover in the manner described. Books sewn with wire go speedly to pieces in the tropics. Since wire sewing has been introduced, a very foolish economy has been substituted, tinned iron wire for tinned copper. The tinning soon disappears from the iron and the book soon falls to pieces.

MUSICAL INSTRUMENTS.

Musical instruments, composed mostly of wood, suffer more in India from the climate than any other structure of the same materials. Organs, pianos, violins and guitars require frequent repairs on account of the shrinking and swelling of their material during the changes from wet to dry weather. The movement of wood in swelling being across the grain and not in the length, swelling and skrinking tend to separate the piece and injure their musical effect. One of the best and most experienced authorities in India, himself a manufacturer of pianos, states that the life of the best sounding board, in India, is, on an average, 18 months. At the end of this time it needs rebuilding to restore the orginal tone. No other material has yet been found to take the place of wood in the sounding board of musical instruments. Although they are built of the most carefully selected and seasoned wood, they have to be put together in a stove where the heat is as high as the workman can bear. This shrinks the wood to the greatest degree, and in this state it is firmly fixed to an iron or steel frame. When in a damp atmosphere, it swells irregularly and this swelling always ends in rupture to a

greater or less extent. Re-building of the board is then the only remedy.

OILS AND DRUGS.

Barrels containing oil are very quickly affected by a hot and dry atmoshpere. The moisture from the wood is evaporated more quickly than the oil can replace it and leakage begins, unless the hoops are set up. Oil, therefore, can only be safely stored in iron tanks. Drug compounds and proprietary medicines are also specially affected in the tropics. Pills lose in time their capacity to dissolve, and gum capsules, by oxidation, become practically water-proof in spite of every possible care having been taken of them.

MANUFACTURES OF STEEL OR IRON.

Steel or iron instruments or weapons meant for use in the tropics should be kept in cases without any linings. Velvet, silk, plush, cloth, or leather linings all absorb moisture and cause the instruments to rust. Nothing will keep them so well as linings of baywood or other absorbent timber which has been well painted, while hot, with a melted paraffin. No wax need remain on the surface, but if the pores are properly filled the trouble and loss due to rusting of valuable instruments or weapons may be avoided. During the monsoon rains all wooden cases containing merchandise for transport must be covered with pack sheeting and tarred unless they are tin lined.

PROCESS OF DRYING MERCHANDISE.

The process of drying merchandise, whether it be textile goods or other material, demands special arrangements during the rains that may fall for weeks together with very little intermission, and the storage of dried and other goods such as tobacco or provisions, has still to be provided for. It may not improbably be found in connection with the ice factories that are becoming common in India, and which by means of suitable extension, might provide cool storage, as is already done in New York. A sufficient reduction of temperature stops the action of moisture even on the most perishable goods. This may be observed in the case of fish and meat, which in Bombay are tainted in a few hours after death. In cold weather in Europe they will keep for several days, and if well frozen they may be preserved indefinitely.

TIGHT CASES.

Much has already been done for the preservation of perishable goods on a small scale, and the use of absorbents in air-tight cases is a great aid in the preservation of samples used in commerce. Lime, chloride of calcium, salt, dried saw-dust and sulphuric acid have their uses as absorbents of moisture, and should all be known and understood in a well-arranged sample room.

Glass show-cases should have a floor as well as top and sides of glass, for a wooden floor, being permeable to moisture, will absorb water vapour from the air and transmit it to the atmosphere of the case. There is thus a flow of moisture through the wood which must either be taken up by absorbents or left to deteriorate the contents of the case. No show-case is absolutely tight, unless it be a bottle with the stopper cemented in place. There is therefore a circulation of air in and out, which is controlled by and due to the fluctuation of barometric pressure twice in every 24 hours. Every closed vessel breathes twice a day, the inflow carrying with it dust and moisture. The dust settles in the still air of the case and the moisture is taken up, partly by the absorbent and partly by the articles within. It is this fluctuation of air pressure that gives movement to the aneroid barometer. Camphor has for a long time been used to repel the attacks of vermin upon furs and textile fabrics, but it is now being abandoned in favour of naphthalene and benzine, whose odour is particularly repugnant to insects of all kinds. Kerosene is also much disliked by them, but being much less volatile its use is limited. Ants will not crawl up the leg of a table or bed around which a rag dipped in kerosene has been tied, and suspended meat safes may be protected in the same way, with a rag tied around the suspending cord.

ADVANTAGES TAKEN OF DRY SEASON.

Machinery, especially that for textile factorils, is imported during the dry season. If it has to be conveyed far from the port of discharge, the makers should be carefully informed regarding the kind of land carriage that will be employed to deliver it. If there is much transport by road, as may easily happen, the quality of the road, the inclines, bridges, and fords should all be carefully examined and reported on, as it might be necessary to restrict the maximum weight of the heaviest article to meet the peculiarities of transport.

Openings for Business.

[For particulars, address the Director-General of Commercial Intelligence, New Imperial Secretariat, 1, Council House Street, Calcutta, mentioning the *Wealth of India*. Firms that may like to follow up any enquiry should give proper references and restrict themselves to those enquiries only which they are fully and seriously qualified to handle.]

LOCK WOVEN MESH.

A Liverpool merchant is desirous of appointing an Agent for the sale of Lock Woven Mesh in Madras. (B283)

SECOND-HAND CLOTHING.

A London exporter of second-hand clothing (uniform and civilian) is desirous of corresponding with buyers. (B285)

HARDWARE.

A firm in Antwerp is desirous of appointing Agents in Bengal for the sale of iron and steel material such as joists, channels, tees, sheets, hoops, etc. (B287)

DIVI-DIVI.

A Bombay merchant is desirous of getting into touch with sellers of Divi-Divi in Bengal and Madras. (B289)

MACHINERY FOR GLASS MANUFACTURE.

A firm in Sodepore (Bengal) is desirous of communicating with dealers in machinery for the manufacture of glass. (B290)

FISH-MANURE.

A firm in Yokohama is desirous of getting into touch with exporters of fish-manure in Calcutta and Colombo. (B291)

GLASS PAPER.

A Manchester firm, who are suppliers of special glass paper for match boxes, is desirous of getting into touch with match manufacturers in India. (B292)

CIGARETTES.

A London firm of cigarette manufacturers is prepared to appoint buying or selling agents on commission in India and Burma. (B294)

GLASS.

A Glasgow merchant is desirous of communicating with Calcutta importers of plate and sheet glass for windows. (B296)

AGAVE.

A Bombay merchant is desirous of getting into touch with buyers of agave fibre in that city. (B299)

GUNNY BAGS.

A merchant in Aleppo, Syria, is desirous of communicating with Shipping Agents of manufacturers of gunny bags. (B300)

LINEN PIECE-GOODS.

A Belfast firm is desirous of appointing Agents in Bombay, Calcutta and Rangoon for the sale of linen piece-goods and handkerchiefs. (B301)

TARPAULIN AND HESSIAN CLOTH.

A firm in Lucknow is desirous of getting into touch with suppliers of country-made tarpaulin and hessian cloth. (B302)

WOOD-WORKING MACHINERY.

A firm in England is desirous of appointing an Agent for the sale of wood-working machinery in India. (B304)

YARNS AND CORDAGES.

A London merchant is desirous of getting into touch with manufacturers of Indian hemp-made yarns and cordages. (B307)

WASTE RUBBER.

A Bombay firm is desirous of getting into touch with shippers of waste rubber. (C3)

DHATURA.

A Lucknow contractor is desirous of getting into touch with Calcutta exporters of Dhatura leaves, trunks and roots. (C6)

MICA ASHES, SOAP-STONE AND LEAD-STONE.

A Calcutta firm is desirous ofcommunicating with buyers of Mica ashes, soap-stone and lead-stone. (C10)

TEXTILE FABRICS, GUNNY BAGS AND GUNNY CLOTH.

A merchant in Cairo is desirous of acting as Agent for exporters of textile fabrics, gunny bags and gunny cloth. (C16)

SEWING MACHINES.

A London firm is desirous of appointing sole Agents in places in India where it is not represented for the sale of sewing machines. (C18)

The Economic World.

Estimates of National Income.

IN making estimates of national incomes, one cannot be too careful, owing to the complexity of the factors involved. For example, the test of the contribution which industrial activities make towards the national income is not the gross output of all trades, for such a figure contains a great deal of duplication. The value of the gross output of the iron trade, for example, includes the value of the coal, ore, and limestone used in smelting, which should properly be regarded as the contribution of mines and quarries. Clearly we shall have counted twice if we take that figure in addition to the total output of the coal, &c, trades. The test of the work done by various industries is to be found in what is called "net output"; that is to say, the gross value of work turned out by each factory less the value of the materials used and the value of work done by commision firms, &c This net output is the sum available for distribution in the form of wages, profits, dividends, taxes, &c., to those engaged in the trade, and represents the contribution of each industry or factory to the sum total of national wealth.

Britain's Work and Income.

Bearing the above remarks in mind, we give below a summary of the final report of the British Census of Production which for the first time affords a scientific estimate of the volume and value of goods and articles of all kinds produced in Great Britain.

Taking all industries, including agriculture and fisheries, and eliminating duplications, the output of the United Kingdom was in 1907 between £1,433,000,000 and £1,448,000,000. Of this, over 400 millions worth of goods were exported, leaving an output of British goods for the home market of £1,003,000,000 to £1,038,000,000.

This is much less than the output calculated hitherto. Mr. Asquith in 1903 computed that the export trade only employed one-fifth to one-sixth the labour of the country—the output of which, on this basis, should have been over £2,000,000,000.

The total income of the country is estimated officially for the first time at about £2,000,000,000 in 1907. Other official returns show that £671,000,000 of this was received by the income-tax paying class (with an income of £160 a year and over).

The various trades aggregate the following figures :—

	England and Wales. £	Scotland. £
Gross output	...1,490,000,000	208,000,000
Materials ...	868,000,000	117,000,000
Net output ...	603,000,000	86,000,000
Persons employed.	5,808,269	885,403
Net output per person.	104	98

	Ireland. £	United Kingdom. £
Gross output ...	67,000,000	1,765,000,000
Materials ...	43,000,000	1,028,000,000
Net output ...	23,000,000	712,000,000
Persons ...	291,304	6,984,976
Net output per person ...	78	102

Returns were not furnished in respect of about $1\frac{1}{4}$ million persons chiefly employed in the clothing, boot and shoe, laundry, and building trades, and their net output, probably £50,000,000, has to be added to the £712,000,000.

Agriculture did not come within the scope of the census, but Board of Agriculture inquiries show :

	G. Britain.	Ireland.
Total output ...	£150,800,000	£45,574,000
Persons employed.	1,840,000	984,000

Fresh and shell fish landed in the United Kingdom in 1907 were worth about £11,718,000, the employed persons being about

107,000. Imports into the United Kingdom are valued at £232,000,000, and it is estimated that from £428,000,000 to £563,000,000 was added to the value of the goods in this country. The total value of all the goods consumed in the United Kingdom (including goods converted into buildings and machinery) was between £1,663,000,000 and £1,833,000,000.

Village Punchayets.

In the course of his presidential address at the Provincial Conference held at Trichinopoly, the Honorable Mr. M. Ramachandra Rao points out that the view that corporate action in the villages has altogether disappeared, has been found in the enquiry by the Forest Committee to be not based on any substratum of fact. It was after a most exhaustive enquiry which showed evidence of the existence of corporate life in villages even to the extent of paying voluntarily fines imposed for the breaches of long standing village customs, that three responsible officials of Government agreed to recommend the constitution of Forest punchayats. The question is no longer open to controversy and it is desirable, says Mr. Rao, to undertake, without delay, alike in the interests of economy and a revival of corporate life in the villages, legislation for the constitution of village punchayats.

Is the High Cost of Living Going Higher?

Mr. Irving Fisher outlines, in the *North American Review*, the forces which magnify the scale of prices. The problem of the scale of prices is a problem of the relation between the gold unit and other things. To predict the price level we must take account of gold ; we must take account of the other things priced in gold ; and we must take account of all the influences which affect the relative values of gold on the one hand, and all other things on the other hand. Let us note that the "purchasing power of the dollar" and "the general *scale* of prices" are reciprocal phrases. If the price scale is doubled, the purchasing power of the dollar will be halved, and *vice versa*.

He quotes a mass of statistics, and on this basis forecasts the future. To answer the question as to the high cost of living going higher, we need to consider (1) the outlook as to inflation of the circulation of money and cheques, and (2) the outlook as to volume of trade. We shall find that monetary inflation promises to continue at nearly the present rate, cheque inflation at more than the present rate, and the growth of trade at no more than the present rate. To be specific, there is strong reason to believe that, for many years to come, the world's money in circulation will continue to expand at *not less* than 2 per cent. per annum (which is ⅓ per cent. less than at present) ; its velocity at *not less* than ½ per cent. per annum ; deposits at *not less* than 6 per cent. (½ per cent. less than at present); and their velocity of circulation at *not less* than 1½ per cent. (the present rate); whilst the volume of trade promises to increase at *not more* than 4½ per cent. per annum (its present rate). On the basis of these estimates we conclude that the total facilities for purchasing goods will probably increase *at least* at the rate of 6½ per cent. per annum, while the volume of trade will increase *at most* at the rate of 4½ per cent., making necessary a probable average annual increase in prices of *at least* 2 per cent. per annum.

Profit Sharing and Co-partnership.

Sir William H. Lever and Sir W. G. Watson, recently delivered some addresses on profit-sharing and co-partnership. Sir William said it was essential for the success of co-partnership, that there should be no faddism, no sentiment, and that no one should be appointed to the directorate who had not been trained for the position. In the case of his own firm, every man who had attained to that position had done so as the result of long and careful training in various capacities. Another essential to success was that the profit to be divided must be additional profit created by the better working, greater saving of waste, and increased economies, followed by an increased output. Unless co-partnership did that, it would fail to produce the results that were hoped for. As to the difficulty of the Trade Union opposition, that was based on an honest

belief that co-partnership and profit-sharing were designed to lower wages, and the conviction that if anything extra was given to the employeesf it would be taken out of them in another way. That could only be overcome by showing that the intention was really to better the conditions of employment, while maintaining the hours and wages and conditions agreed upon as good by the employers and the trade unions in conference. Sir William, Watson followed with an address on the same lines, after which questions were invited. Several gentlemen stated that they were in favour of co-partnership and profit sharing, but had met with difficulties in giving effect to their views. One of the speakers said that he offered shares to his employees, one of whom took up a hundred. Next day, in the workshop, he remonstrated with a fellow-workman for wasting the gas. The reply was, "Oh, there are too many blooming policemen about this business," and the following day the whole of the employees struck work. Earl Grey expressed himself as convinced that along the lines indicated by the speakers were to be found solutions of the problems that affected capital and labour.

The Economic Effects of a Great European War.

An article on this subject, which appeared in a recent issue of *Le Matin*, from the pen of M. Edmond Thery, President of the French Press Economic and Financial Association, expresses the opinion that the effects of a great European war would be so tremendous that he believes it will always be avoided. He says :—

"The frightful slaughter of human beings on the fields of battle in Macedonia, Epirus and Thrace reproduce, on a small scale the horrible spectacle which Europe would present if a war took place amongst the great military nations. As a matter of fact, such a war would not be conducted, as formerly, by standing armies, comparatively small in number and nearly standing apart from the economic life of the people. It would be between armies truly national, comprising all the able-bodied citizens of each country, who would bring into operation the most terrible means of destruction imaginable. A second war of this nature would be impossible, for the first would result in extermination in the most awful sense of the word. It would ruin all European nations alike, and set back civilization for more than a century.

"There is this justification for examining the subject from an economic and financial standpoint. Civilisation, and all social progress and human well-being, rest to-day on public credit, which is the most fragile thing in the world.

"In the present troublous year, Europe possesses about 750 milliards francs (750 thousand millions frs., *i.e.*, £30,000,000,000) of capital, representing machinery of production, capital circulating in industry, in agriculture and commerce, and reserves, insurance, etc.

"This capital is increasing yearly by about 20 or 25 milliards and circulates from hand to hand like actual coins, because those who buy or hold paper money know that they have only to take it to a bank in order to obtain cash at the rate of exchange of the day.

"In ordinary circumstances, the system works admirably, the coin circulating infinitely more quickly than the instruments which represent it. A small quantity of coin can be used in a single day to effect settlements ten, fifteen, or twenty times greater than its intrinsic value. But as soon as some grave political, or more especially, international crisis arises, coin begins to circulate but slowly, because those who retain it naturally wish to keep it in their possession owing to their fears as to the future. Now if it is remembered that as regards the 750 milliards of capital possessed by Europe, of which 50 or 60 milliards are banknotes, cheques, and other paper money in general circulation, and only 35 or 40 milliards of francs coin (of which a great portion is retained in the State Banks or Banks of Issue), the awful effect on public credit of a war between the great nations of Europe is evident. In 1870, the mass of European

capital consisting of cash and instruments of credit certainly did not exceed 200 milliards of francs; the disposable coin was not more than 30 milliards, and the great organs of the Press with their present world-wide sources of information had not then such an embarrassing effect upon public action as is the case to-day.

"Immediately on the announcement of a great Continental war, all capitalists would try to realise some portion of their assets, precisely at the moment when no one desired to buy them. This was what happened on a very small scale on the 12th October, 1911, when the Japanese had torpedoed the Russian fleet at Port Arthur.

"In short, the simple prospect of a European war would cause such disasters in all ranks of society, and compromise so gravely all the social and economic interests of Europe, that it is impossible to believe that the Governments interested would not—if even in the very last resort—find some means of avoiding it, both as regards the events of to day, and whatever might arise."

Problems of Poverty

We gather from the June issue of the *Journal of the Royal Statistical Society* that the first number has been published of a series of memoranda on problems of poverty which are being issued by the Ratan Tata Foundation of the University of London. The Ratan Tata Foundation has been instituted in order to promote the study and further the knowledge of the methods of preventing and relieving poverty and destitution. For the furtherance of this purpose the Foundation conducts inquiries into wages and the cost of living, methods of preventing and diminishing unemployment, measures affecting the health and well-being of workers, public and private agencies for the relief of destitution, and kindred matters. The results of its principal researches will be published in pamphlet or book form. In addition to these methods of publishing information, the officers of the Foundation will, as far as is in their power, send replies to individual inquiries relating to poverty and destitution, their causes, prevention and relief, whether at home or abroad. Such inquiries should be addressed to the Secretary of the Ratan Tata Foundation, School of Economics, Clare Market, Kingsway, W. C. The officers are also prepared to supervise the work of students wishing to engage in research in connection with problems of poverty. In addition, courses of lectures will be given from time to time; the first course, introductory to more advanced investigation, will be given by the Director of the Foundation, at the London School of Economics, in Michaelmas, 1913. These Courses will be open to the public.

The present pamphlet, which deals with the incidence of taxation on the working-class family, is by Mr. F. W. Kolthammer, M.A. The writer treats his subject under three heads, *viz*, method and source of taxation, food taxation, and taxation of alcohol and tobacco. While acknowledging the usefulness of the information contained in the annual Statistical Abstract of the Board of Trade and in the Fiscal Blue-books, as a preliminary groundwork for inquiry, it is emphasized that only personal investigation among consumers and traders can supply those corrections which statistics, based "on general and universal figures," necessarily demand. The writer's conclusions in regard to food taxation—sugar, cocoa and coffee, tea and dried fruits—are summarized as follows, *viz.*:—

(i) It is regressive. The smaller incomes pay a disproportionately large percentage.

(ii) Assuming a normal consumption, it amounts to 1·25*d.* per head per week, or, in the case of the average family, to 6*d.* a week.

(iii) The higher family incomes among the working-classes reach this amount; if the family be small, or the number at work large, consumption frequently exceeds the normal.

(iv) The consumption of taxed foods by middle-class families does not exceed that which obtains in many working-class families; very frequently it is lower. The superiority of their standard of life, in so far as food is concerned, depends rather on foods that are not taxed.

(v) On the whole, the lower the family income the less the total contribution to the national expenditure, but the greater the percentage of income taken thereby. In other words, regression is practically continuous and universal, though its degree admits of exaggeration.

(vi) The lower the standard of comfort, the larger the percentage of food expenditure which is taxed. When the cheaper jam displaces the dearer butter or margarine, as also when the cheaper condensed milk displaces the dearer cow's milk, a portion of the family income which was before untaxed automatically becomes taxed.

Restriping of Lands.

Among the causes which stand in the way of improving the economic condition of the agriculturist is the minute sub-division of holdings as the result of the law of inheritance obtaining in India. It is time, we think, that some steps should be taken to consolidate the holdings in bigger plots without injuring the interests of the rightful owners. The people of Switzerland have apparently a similar problem to tackle. A writer in the *Bulletin of the Bureau of Economic and Social Intelligence* for March gives a very interesting account of the re-striping of holdings which is being carried out in that country and the economic benefits that have flowed therefrom. It would appear that 76·59 per cent. of the area under cultivation is free property, 19·83 is held on lease and 3·58 per cent. of the whole is worked by usufructuaries. The largest number of free proprietors have small farms. The writer adds that "this large proportion of small properties has been a benefit, and will always remain our best social safeguard. But we must endeavour to attentuate the evil effects of a too minute sub-division, in the interest of the small holdings themselves, and try to increase their rental capacity." When the total area is parcelled out, it is seen that 2,088,377 hectares is divided into 3,479,207 parcels, each farm containing on an average of 14·3 parcels of an average area of 60 acres. After an examination of the way in which sub-divisions have been carried out, the writer comes to the conclusion that there is excessive division of the land, and the absence of roads, the irregular forms of the parcels, rendering efficient cultivation impracticable. He adds that until a more regular sub-division is made and communication is made easier, agricultural conditions cannot improve very much. Generally, re-striping has been carried in cantons under the Rural Law of 1875 which enacted that Rural Commissioners of from five to nine members should be appointed to settle all differences, that all parcels of land were to be provided with farm roads within four years and that the re-striping might be undertaken as soon as two-thirds of the number of proprietors interested and possessing half of the land declared themselves in favour of it, the State making a grant, generally of a third, of the expenses. Very desirable results have followed this policy, and the value of land has arisen in consequence. The Swill Civil Code, in Article 703, provides for compulsory re-striping when approved by two-thirds of the owners interested, representing more than half the land, and cantons are given the power of modifying these conditions and of applying the same rules to building ground. Re-striping, which is now recognised as important throughout Switzerland, is often combined with other schemes of land improvement and the revision of the land register. The economic value of re-striping is descfibed by the writer as follows: "Of the sum total of the measures taken by the State to encourage and promote agriculture, re-striping and land improvement in general form the point of departure without which efforts are illusory or do not lead to the results that might be expected from the money and efforts expended. It is useless to spend money freely to increase crops by suitable manuring, or to sow choice seeds, if the results anticipated are nullified by the inconvenience and needless expense caused by the irregular form and small dimensions of the parcels." The advocates of this measure also say that a considerable increase has followed in the value of the land, owing to the

improvements made. It is argued that a small farmer exhausts his forces by cultivating small parcels of land often distant from one another, which entails loss of time and increase in working expenses. The object of re-striping, the writer adds, is not to diminish the number of proprietors, nor to disperse the property ; not yet to return to the system of large estates. Re-striping is distined to be continually repeated because of the rights of succession. Restriping especially for the small proprietor is a work of great social importance, calculated to increase his return and to improve his conditions of existence.

Restriping offers the double or triple advantage of agriculture, diminishing the cost of enclosure and surveying and finally of abolishing servititudes.

The saving of the expense of enclosure would often equal the cost of re-striping. As an example, by no means exaggerated, the saving in enclosure amounts to 50 °/ₒ of the cost of enclosing land not-re-striped.

Is the Land Revenue a Rent or a Tax ?

Mr. S. Satyanarayana writes to the *Hindu* :—

Curiously enough, during the discussions that attended the consideration of the proposal of a permanent settlement and the fiscal administration of India, heated arguments were employed either by the supporters of the fixity of State demand on land or by the advocates of the Periodic Settlements, about the question whether the State demand should go by the denomination of 'rent' or 'tax.' So long as the State demand on land continues to know no limits, it is a matter of small consolation to the cultivating tenant whether the said demand is exacted from him either under the cover of rent theory or the tax theory. He does not find solace and comfort in the scientific and technical terms used in the determination of the said demand. Though the said discussions do not profess to possess any more than mere academical value or interest, yet they reveal to the intelligent public the basic principles by which the land revenue administration in India is carried on. If a dispassionate discussion is embarked on, on the theory of rent or tax, we cannot summarily dispose of the question without at first clearing the ground whether the proprietorship of the soil vests in the State or in the cultivating tenant. Adherents of rent theory assert that the land belongs to the State and the State as such landlord can increase the demand on land to any conceivable extent on the ground that the rent claimed by the State is a proportion of the produce of soil after necessary expenses for cultivation, profits of stock and wages are deducted in favour of the ryot. I do not now propose to dilate as to the part this enunciation of rent principles plays in the operation and the result of periodic settlements taking place from time to time in the various provinces. State landlordism is a idea conceived by the English rulers and it did not and could not find a place in the history of the Hindu Kings. To prove that the State does not possess the proprietorship in land does not require many arguments. If it really possessed the same, it need not go the length of passing the Land Acquisition Act under which lands have been from time to time purchased for laying roads and railways and constructing irrigation projects, but might serve notices on the occupiers of the soil to quit the land. John Stuart Mill in a return to the House of Commons in 1857 emphasised that land throughout India was generally the private property subject to the payment of revenue. The Court of Directors, in their correspondence with the Madras Government in 1856 emphatically repudiated the doctrine of State proprietorship. Mr. Sullivan, a member of the Famine Commission of 1878, established that State could lay no claim to the proprietorship of the soil. Thus it is clearly shown that State has no vestige of proprietorship in the soil. If we should be delighted to call land revenue a rent, the ryot is entitled to hold the government in strictness liable to share all that remains after wages, cultivation expenses, profits of stock etc., have been paid which are not strictly observed in periodic settlements of lands. In view of the above, the rent theory

as is understood by the official heirarchy and which is indissolubly connected with the State landlordism falls to the ground.

On the other hand, Mr. Fawcett, one of the best authorities on Political Economy has established beyond the shadow of a doubt, that the land revenue is a tax. Baden Powell, in his land tenures in India explicitly says that land revenue is nothing but a tax on land just as other taxes. The Court of Directors in their Despatch of 17th December 1856 expressed that the right of the Government is not a rent and the same was also repeated by Sir Charles Wood, the then Secretary of State for India in his Despatch of 1864 that the ½ share of the so-called rent was a tax. Mr. A. Rogers one of the ablest revenue authorities in the ranks of the I.C.S., remarks that land revenue in Bombay is a tax on rent. Lord Salisbury in his minute on "Indian Land Revenue" has made the following observation—" I agree, therefore, with Sir Louis Mallet in desiring that our present nondescript land dues should tend to the form of revenue rather than of rent." Even the early Hindu Kings considered the land revenue as a tax as is clearly shown from the following—"Cultivators must pay to the King a tax amounting to one-tenth, one-eighth or one-sixth, of the produce,"—*Gauthama's Dharma Sutra X*. As was set forth at the outset, the quibble of technical words does not go far to ameliorate the condition of the Indian peasant, and the amount of land revenue to be collected from him under whatever name or theory must have a limit.

The Economic Condition of the U. S. A.

Students of politics, economics, and social problems generally, will read with intense interest the following passage from President Wilson's inaugural address :—

Our life contains every great thing, and contains it in rich abundance.

But the evil has come with the good and much fine gold has been corroded. With riches has come inexcusable waste. We have squandered a great part of what we might have used and have not stopped to conserve the exceeding bounty of nature, without which our genius for enterprise would have been worthless and impotent, scorning to be careful, shamefully prodigal as well as admirably efficient. We have been proud of our industrial achievements, but we have not hitherto stopped thoughtfully enough to count the human cost, the cost of lives snuffed out, of energies over-taxed and broken, the fearful physical and spiritual cost to the men and woman and children upon whom the dead weight and burden of it all has fallen pitilessly the years through. The groans and agony of it all had not yet reached our ears, the solemn moving undertone of our life, coming up out of the mines and factories and out of every home where the struggle had its intimate and familiar seat. With the great Government went many deep, secret things which we too long delayed to look into and scrutinize with candid, fearless mind. The great Government we love has too often been made use of for private and selfish purposes, and those who used it had forgotten the people.

At last a vision has been vouchsafed us of our life as a whole. We see the bad with the good, the debased and decadent with the sound and vital. With the vision we approach new affairs. Our duty is to cleanse, to reconsider, to restore, to correct the evil without impairing the good, to purify and humanize every process of our common life without weakening or sentimentalizing it. There has been something crude and heartless and unfeeling in our haste to succeed and be great. Our thought has been 'Let every man look out for himself, let every generation look out for itself,' while we reared giant machinery which made it impossible that any but those who stood at the levers of control should have a chance to look out for themselves. We had not forgotten our morals. We remembered well enough that we had set up a policy which was meant to serve the humblest as well as the most powerful, with an eye single to the standards of justice, and fair play, and remembered it with pride. But we were very heedless and in a hurry to be great.

We have come now to the sober second thought. The scales of heedlessness have fallen from our eyes. We have made up our minds to square every process of our national life again with the standards we so proudly set up at the beginning and have always carried at our hearts. Our work is a work of restoration.

We have itemized with some degree of particularity the thing that ought to be altered and here are some of the chief items. A tariff which cuts us off from our proper part in the commerce of the world, violates the just principles of taxation and makes the Government a facile instrument in the hands of private interests; a banking and currency system based upon the necessity of the Government to sell its bonds fifty years ago and perfectly adapted to concentrating cash and restricting credits; an industrial system which, take it on all its sides, financial as well as administrative, holds capital in leading strings, restricts the liberties and limits the opportunities of labour, and exploits, without renewing or conserving, the natural resources of the country; a body of agricultural activities never yet given the efficiency of great business undertakings or served as it should be through the instrumentality of science taken directly to the farm, or afforded the facilities of credit best suited to its practical needs; water courses undeveloped; waste places unreclaimed: forests untended, fast disappearing without plan or prospect of renewal, unregarded waste heap at every mine.

We have studied, as perhaps no other nation has, the most effective means of production, but we have not studied cost or economy as we should, either as organizers of industry, as statesmen or as individuals. Nor have we studied and perfected the means by which Government may be put at the service of humanity in safe-guarding the health of the nation, the health of its men and its women and its children, as well as their rights in the struggle for existence.

This is no sentimental duty. The firm basis of Government is justice, not pity. These are matters of justice. There can be no equality of opportunity, the first essential of justice in the body politic, if men and women and children be not shielded in their lives, their very vitality from the consequences of great industrial and social processes which they cannot alter, control or singly cope with. Society must see to it that it does not itself crush or weaken or damage its own constituent parts. The first duty of law is to keep sound the society it serves. Sanitary laws, pure food laws and laws determining conditions of labour, which individuals are powerless to determine for themselves, are intimate parts of the very business of justice and legal efficiency.

These are some of the things we ought to do and not leave for others undone—the old-fashioned, never to be neglected, fundamental safe-guarding of property and of individual right. This is the high enterprise of the new day, to lift everything that concerns our life as a nation to the light that shines from the hearth-fire of every man's conscience and vision of the right. It is inconceivable that we should do this as partisans; it is inconceivable we should do this in ignorance of the facts as they are or in blind haste.

We shall restore, not destroy. We shall deal with our economic system as it is and as it may be modified, not as it might be if we had clean sheet of paper to write upon; and step by step we shall make it what it should be, in the spirit of those who question their own wisdom and seek counsel and knowledge, not shallow self-satisfaction or the excitement of excursions whither they cannot tell. Justice and only Justice shall always be our motto.

The Financial World.

Banks in the United Kingdom.

THE following is a summarised balance-sheet of all the banks of the United Kingdom for the last two years:—

LIABILITIES.

—	1911-12.	1912-13.	Inc. or Dec.
	£	£	£
Capital and reserves.	130,186,000	130,858,800	Plus. 672,800
Undivided profits.	5,950,100	6,459,100	" 509,000
Deposits . .	1,015,634,900	1,053,542,700	" 37,907,800
Acceptances .	55,189,300	68,848,500	" 13,659.200
Notes, bills, &c.	49,612,300	51,945,500	" 2,333,200
	1,256,572,600	1,311,654,600	" 55,082,000

ASSETS.

—	1911-12.	1912-13.	Inc. or Dec.
	£	£	£
Cash in hand and money at call and notice.	295,204,000	302,436,500	Plus.7,232500
Investments .	234,198,700	228,816,800	" 5,381,900
Discounts and advances.	660,634,800	701,532,900	" 40,898,100
Premises and cover for acceptances.	66,535,100	78,868,600	, 12,333,300
	1,256,572,600	1,311,654,600	" 55,082,000

Founders' Shares.

Founders' shares are usually held in the first instance by promoters or underwriters for services rendered in connection with the promotion of the company. Occasionally the public become entitled to an allotment of (say) one Founders' share for every hundred Ordinary shares subscribed. These shares, which usually rank after the Ordinary or Deferred shares, are very often of great value; for example, the founders of Harrod's Stores took £1,400 of shares, and during the past thirteen years they have received in dividends about £500 for each £1 share. Objection is frequently taken by Ordinary shareholders that so large a proportion of the profits fall to the founder shareholders, but this objection overlooks the fact that the rights of the founder are established by contract. Moreover, the founders were prepared to lose their capital if the venture should fail; where the company succeeds they are fairly entitled to all their stipulated share of the profits of a successful speculation. A more valid objection to the class of founder shareholders is that their influence with the directors is often such that profits are divided up to the hilt in order that the market value of the shares may be maintained.

Buying and Selling Price of Shares.

What is the cause of the difference between the buying and selling price of shares? Is not the price at which I buy the selling price of the one from whom I buy? The *Financial Review of Reviews* points out that the confusion on this point is probably the most fruitful source of misunderstanding among investors that exists. " If the price of a share is quoted at 1—1⅛ (that is, 20*s.* to 22*s.* 6*d.*), the purchaser may buy at anything between those figures, and for example, we will assume he buys at 21*s.* 6*d.* When he receives his transfer form, he will probably find that the original vendor sold at 21*s.*, or even as low as 20*s.*, and he does not understand for what reason he should be called upon to pay 21*s.* 6*d.* The explanation lies in the fact that the shares may have changed hands several times during the course of the Stock Exchange Account, A having sold at 20*s.* to B, and B having resold to C at 20*s.* 6*d.*, and C having resold to our correspondent at 21*s.* The transfer is naturally from A to C, B having been eliminated from the transaction. If the transaction is from A to B only, no further transactions taking place, then the difference between the price A sells for and the price B buys at would represent

the jobbers' "turn," that is, the profit made by the dealer who holds the shares. The dealer buys and sells according to the demands on him, and as he always risks a big fall in the price, he must naturally make a profit to cover the risk he runs."

Hoardings by Government.

At the close of the last financial year, on March 31 last, the Government of India had in the public treasuries, and at its credit with the Presidency banks and their branches, the sum of Rs. 18,41,01,000, the distribution being as follows :—

	Rs.
In the head offices of three Presidency banks	2,00,86,000
In the three reserve treasuries	5,19,90,000
In Mofussil (or up-country) treasuries, including branch banks	11,23,25,000
Total...	18,44,01,000
As against a total in the preceding year of	20,35,04,000

The figures showing the apportionment to each Presidency and Province for 1911-12 are not yet published, but in 1910-11 the distribution was : -

	Rs.
India, general	5,93,14,702
Central Provinces and Berar ...	1,52,64,583
Burma	1,28,49,239
Eastern Bengal and Assam ...	87,81,905
Bengal	1,04,80,961
United Provinces of Agra and Oudh	1,39,29,715
Punjab	9,73,983
North-west Frontier Province	9,82,606
Madras	3,26,98,954
Bombay	3,94,27,183
	20,35,03,834

At Rs. 15 to the £ = £13,566,922.

The foregoing figures will show how small a proportion, relatively, the banks hold, and in the face of all we hear from Government sources regarding the evils of hoarding, it is noteworthy, says a writer in the *Statist*, that Government itself is the chief offender in this respect. With money available, in the Reserve treasuries or Gold Standard Reserve, there would seem little justification for the continuance of high Banks rates in India; yet there it is and a good deal of the annual tightness of money is due to the very unsatisfactory method of locking up enormous sums out of the currency in the reserve treasuries. The fact is, in 1874 the Government had to buy rice in Burma for a famine. It had to pay cash and wanted £300,000, the credit balance in the bank of Bombay being £1,000,000. The bank could not let the Government of India have the money. On this, Lord Salisbury suggested not to keep the whole Government balances with the Bank but to keep them locked up ; and though the Government did not approve of it, in 1876, the reserve treasury system was set up, a small balance being kept under certain conditions in the Presidency Bank. The rest is kept in district and reserve treasuries, and in February 1913, the Government balances were £19,300,000, out of which 8 millions lay in the reserve treasuries. "What money market in the world could have seen such sums taken out of its use and control in the busiest moments of the year without suffering a loss of use?" asks Mr. Keynes, of the Indian Finance Commission. The situation was not due, he writes, "in my judgement to any ignorance or incompetence on the part of the Executive officers of the Government, but to a system which provided them with no sort of appropriate machinery for dealing with the position. The 'independent treasury system' and the traditional aloofness of Government from the Money Market were seen at their worst. Millions of rupees were lying idle in the Government treasuries at the time of the year when there was much work for them to do outside." Mr. Keynes further admits ' that the Government have had no consistent policy on this subject and the effect of recent practice has been to divert more fund than formerly from banking purposes. Mr. Keynes points out that in 1874 the Government's deposits in the banks were a large proportion of the private deposits.

In 1870 they exceeded the total capital and deposits. In 1912 the Government deposits of $2\frac{1}{2}$ millions were not one-tenth of the private deposits and the capital and reserves of the Bank have greatly increased. In fact times have changed since 1874 and the Government still adheres to medieval methods of keeping up its money.

The Gravity of the Financial Position.

The Financial papers received during the last few weeks contain grave warnings of the weakness of finance in all the countries of the world, which Indian bankers and business men will do well to note and watch. The desperate attempts made by the English bankers to prevent gold flowing freely into India are clearly due to the paucity of liquid capital in England and in other parts of the world as well, consequent on over trading and speculation. Everywhere money is urgently wanted and indeed a crisis has arisen in the loan market. Of ten recent issues the public has subscribed less than £3,000,000, and underwriters have been saddled with over £25,000,000. Of the South African loan, the latter were left with 94 per cent., of the Indian loan 90 per cent.. of the Auckland issue 90 per cent., of the Madras and Southern Mahratta debentures 90 per cent., of the Bahia loan 88 per cent., of the Westralian loan 87 per cent., of the Saskatchewan debentures 85 per cent., of the City of Edmonton loan 80 per cent., of the New South Wales loan 75 per cent., of the Madeira-Mamore bonds 80 per cent., of the Grand Trunk Pacific debentures 80 per cent., of the Edmonton loan 80 per cent., and—last but worst fiasco of all—of the Brazilian loan 94 per cent. The issuing houses have included the Bank of England, Messrs. Rothschild and Speyr and numerous others in which investors have the most complete confidence. So much for the past.

"As regards the future, the seriousness of the situation is increased by the fact that from all parts of the world heavy further demands are in prospect. China wants £25,000,000, The American railroad companies urgently require millions for double tracking and electrification as well as for minor schemes of improvement that will brook no further delay. Australia is known to be anxious to arrange loans, the small amounts raised at home being a trifle compared with the requirements. The Balkan States need large sums to repay the costly temporary advances secured to finance the war, and far greater amounts to rehabilitate and develop the newly acquired territories. Turkey is in urgent need if her Asiatic Empire is not to share the fate of her European possessions, and decay for lack of nourishment. France has big loans to which her Government is committed and has others in contemplation for home and for colonial purposes, notably in Morocco. Germany cannot finance her armament policy out of revenue. Mexico must have money to quell her revolution and establish a stable government. Japan, Spain, Austria and Italy all need loans; even Portugal desires a larger navy. Canada is always an insistent borrower. Matters in America seem to be causing great anxiety."

A writer in the *Investor's Chronicle* of 21st June points out that recent events show that both domestic and foreign conditions are worse than they appeared some time ago. Here are some:—(1) The Controller's report showing the lowest % of cash to loans in any spring since 1883; (2) Receivership for St. Louis and San Francisco road because of inability to borrow about $2,250,000; (3) Weakness in foreign markets; (4) Continued decline in Canadian Pacifics (5) Practical refusal of German banks to pay out gold; (6) Insatiable demand for money by foreign governments; (7) Practical failure to float most loans recently brought out in European countries. All these indicate that the world's credit, its liquid capital, has been exhausted; that all markets are glutted with undigested or half-digested securities; that saturation point has been reached.

Leading bankers in America have begun to sound notes of alarm. Mr. Joseph T. Talbert, of the National City Bank of New York, recently strongly advised his banking friends to use great caution in making loans. He told them

that "we cannot now, as in former years, rely upon Europe to absorb our securities and that we must do our financing at home." He expressed the opinion that instead of having a big credit balance abroad, as statistics indicate, there is really an annual international debit balance. He also said that "The leading bankers of Europe and those financiers who are best in a position to know, are of the opinion that we have entered a period of dear money, the duration of which is indefinite.......All forms of enterprise involving fixed investments of capital should be discouraged if not entirely denied."

The critical situation of American banking conditions is shown clearly, as well as graphically, by Mr. Frederick R. Macaulay, in an article in the New York "*Times Annalist*" of 2 June. His chart indicates that for the seventh time in the history of American banking they have entered a period when the ratio of the lawful money holdings to loans and discounts is running below 15°/, The six previons historic periods when ratios were running below the 15 per cent. line either coincided with or immediately preceded very dark spots in economic history—1873, 1876-77, 1883, 1890, 1893 and 1907. The year 1890 is the only one concerning which this judgment may be questioned. The usual course has been for severe stock market liquidation to set in about the time ratios fall through the 15°/, line, and this has culminated in panic in five cases out of the six completed ones, and in the sixth—1877—though no actual panic occurred, prices reached unheard of depths. The banks are holding a relatively larger quantity of securities than a few years ago, and the possibilites of realising upon securities in a declining market are not very encouraging. The writer in the *Investor's Chronicle* from whom we have largely quoted above continues:—

"Mr. Macaulay has made a careful study of banking conditions in leading countries. He confidently predicted that the world's markets were on the eve of a great decline. A few days ago he agreed with me in the opinion that we are now on the brink of a period like that of 1873-78 or that of 1893-97—periods of major commercial crises. A severe business crisis may not occur either this year or next, but conditions are favourable for such a crisis. Most of the banks in this country and in Canada are trimming sails and are preparing for a hard storm, and this is increasing the money strain on business, and will result in increased losses and failures."

The *Economist* of 14th June summarising the financial position observes thus: "We have to face the following facts :—Germany is desperately in need of capital, and the Reichsbank, in its desire for gold, will even risk a 5 per cent. Bank rate in London. America's monetary position is weak, and the danger of more receiverships among her rail-roads is indisputable. She has the double task of moving full average crops and of financing an enormous number of short-term notes ; she can scarcely carry through without drawing on Europe's supply of gold, and Europe may be in no position comfortably to respond."

Indians who are doing business with America will do well to watch the position carefully.

Indian Currency and Exchange.

'An Expert Correspondent' writes in the *Financial Times* :—Now (that a conclusion has been drawn in preceding articles) that silver coin in profusion is needed by the population of India for home circulation, and gold for the discharge of external debt, whenever failure of crops takes place, attention may profitably be directed to some of the methods employed by different nations for the purpose of maintaining a fixed relation between their silver currency and gold—on the basis of which the balance of trade between all the important countries of the world is settled, with the exception of China—a notable exception, by the way, because of the size of its population, representing one-quarter of the human family. The Government of China, however, has pledged itself to remove the inconveniences arising from this anomaly at an early date so that within the next few years practically the whole world will measure its value in gold.

The expert in monetary matters frequently makes use of the term 'sound' in regard to currency systems. In practice it is difficult to allow such a term in regard to any currency system existent at the present time, except quite in a comparative sense. For a currency to be 'sound,' the ordinary man expects it to be proof against any combination of circumstances. With the present international systems, were payment in nothing else but gold demanded, even to a restricted degree, by individuals, the maintenance of the system of international currency on its present lines would be impossible. On the other hand, supposing sea water could be relieved, at small expense, of the infinitely small fraction of its contents which consists of gold, prices the world over would meet with a staggering blow.

After all, gold is but the handiest makeshift available for a perfect basis. The stock of an ideal world currency should increase or decrease in exact ratio to the wealth of the world, if it is to be a perfect measure of values. Gold falls far short of this, for not only does its output vary considerably—it has increased 300 per cent. in the last 25 years—quite independently of the wealth of the world, but as a commodity, its absorption for the arts and sciences is subject to alteration.

A SOUND CURRENCY.

A 'sound' currency is capable of conception but is too Utopian for practical consideration, because it is founded on perfect international agreement, including the abolition of war, and also involves mutual confidence in the financial methods and stability of each contracting Power. Laying aside, therefore, the idea of a perfect, 'sound' currency, as an impracticable proposition, the world must be content with a system that works with the least possible friction. This is provided by the creation of a financial centre, the most central so far as trade is concerned, as a pivot. London at present occupies this position and is the better equipped for this role by the fact that it is the capital of the British Empire, whose possessions stretch to the farthest confines of the world, and whose rule, directly or indirectly, affects the welfare of 660 millions of people. Speaking broadly, the balance of the world's trade is adjusted through London. According to which side of the scale the balance falls, London deals out or takes in gold. Provided a nation remits to this country sufficient in goods or gold, this country is prepared to remit in goods or gold to the value of that nation's debt to any other country, and thus. London is the world's banking clearing house

It follows that the power of drawing gold from London when desired is the factor which above all else, provides any country with the means of maintaining foreign exchange favourable to itself. When the trade of a nation is adverse—that is to say, when its imports exceed its exports, it must either deplete its stores of gold or nullify the effect of its adverse trade balance in some other way. The most economical process by which this can be done is to hold bills on London, or British securities which, by the excellent market which they possess, in ordinary circumstances prove as useful as gold. This is the practice of many Government banks in Europe, and has been adopted by Japan and the United States. Another, but more expensive plan, is to keep cash balances in the Bank of England or other banking institutions in this country. Whilst gold remains a basis for settling international debts, the due relation of the internal currency of any nation to gold can be maintained by ensuring in some such manner that its credit is good in London. It matters little whether its subsidiary coins are minted at 15, 25 or even 50 per cent. above their gold value so long as the balance of its world trade be in its own favour, or that its credit is sufficiently good for the debt to remain in temporary abeyance. It is really impossible to estimate with any degree of accuracy the enormous fancy value which has been imparted to silver coin in both hemispheres. This enhanced value has relieved taxation to the extent of the difference between the purchase price of the silver minted and its value as a legal coin.

LONDON AS THE BANKING CENTRE.

The practice of using London as the bank-

ing centre of the civilised world has been justified by results. The more it has been utilised the steadier have exchanges proved throughout the world. It has also conduced to the solidarity and comity of nations by rendering the world as sensitive as a barometer to the changes of political weather. Without it a large portion of the world's gold reserves would be shipped from country to country, only to commence a fresh journey by the next steamer to another part, and not only would freight and insurance charges be frittered away, but a great waste of interest would be incurred, and in the meantime, trade might be checked as a consequence of delay caused by such circuitous remittances. By means of the present centralisation, credit can be transferred by cable to far distant countries with the utmost ease, reducing the inconvenience of payment for goods to a minimum. It will be deduced from the foregoing remarks that the easy working of the present system depends on whether the production of gold meets the demands placed upon it, and also on the absence of any movement on a large scale to attract and retain gold to an undue degree.

It is apparent to the careful observer that the pace at which the production of gold increases is not so fast as the rise in value of the world's wealth. India has suddenly developed an enormous appetite for gold, not for circulation, be it observed, but for the purpose of public and private reserves. These two points render the currency system of India a matter touching the very pocket of the man in the street, as well as a question which affects the basic foundation upon which the structure of internationl and national banking has been reared. The day has gone by for any nation on earth to live an isolated life.

Swadeshi Banking.

The Honourable Mr. De. P. Webb writes:—Capital is essential for wealth creation. India badly lacks good supplies of cheap capital. This does not mean that there are no supplies at all of capital in India. Immense accumulations of unemployed capital exist in this rich division of the British empire; but these accumulations are not at present all used in the best way, that is, in a way profitable both to (*a*) the owners of the capital, and (*b*) the community at large How to remedy this defect is a problem well worth the attention of every patriotic Indian.

What is capital? Capital is simply wealth set aside for the satisfaction of future needs. There is plenty of such wealth in this great continent of India, from the substantial reserves of some of the Indian Princes to the tiny hoards of the more thrifty agriculturists. And as there are probably more aristocrats and certainly far more people in India than in any other part of British Empire, it is not outside the realms of the possible that there may be far greater accumulations of capital in India than in any other portion of the Empire except, probably, Great Britain itself.

Unfortunately these accumulations of capital are not all being employed reproductively, and India is not, therefore, advancing as rapidly in the work of wealth creation as she might otherwise do. The former fact is very strangely regarded in the West. Thus, it is now-a-days a popular belief in Europe and America that the peoples of this country have inherited such an extraordinary passion for gold and silver that any of the precious metals which are imported into India, will never be seen again by the outside world! No doubt much gold and silver are hoarded in India, in one form and another. Even so, the hoarding habit is by no means peculiar to India. Distrust of Government, or of the local representatives of Government, or of the surrounding conditions, or of the world's politics may each and all lead to hoarding. Want of opportunity for investment, or lack of attractiveness or insufficient faith in the opportunities that offer, may lead individuals to hoard. Illiteracy, ignorance, indifferent means of communication, and a dozen other causes explain the habit of, or tendency to, hoarding. The hoarding of money was quite common in England up to the middle of the last century. In some parts of France the practice still continues,

partly because of the French banking systems and partly because of a general distrust in the powers that be. In Germany a lot of hoarding still goes on; while in South Eastern Europe, in consequence of the Balkan War, every body who can, has recently been hoarding money. Sensible, hard-headed America even, is not above the habit: and whenever there is a financial crisis in the United States,—and such things are not uncommon,—there is generally a disappearance of metallic money in different parts of the country. At the present moment, with no financial crisis in sight, the democratic Government of the peace-loving Yankee *hoards over £250,000,000 in gold,—more, it is believed, than either militant Russia or mail-fisted Germany.*

If, then, some of India's old-world Princes, with the customs and traditions of centuries behind them, or a few millions of our hard-working Indian peasants living perhaps scores of miles away from a railway, and even farther from a good bank, err in hoarding an unnecessarily large amount of ready cash, they err in very good company. Still, let it be freely admitted, they do err. In Great Britain, communications have been very greatly improved and the general level of knowledge and understanding considerably raised, in the last fifty years. So, too, in the same period, immense strides have been made in the business of banking in England. The habit of hoarding has in consequence practically died out in Great Britain. Here it is that India must profit by the experience of the United Kingdom. Government in India is now thoroughly reliable and stable. Communications are yearly being improved and extended, whilst education is spreading in all directions. Let India then hurry on with her banking development. This advance is *now* most important and should receive the closest attention.

The chief business of a modern bank is—

(1) To take charge of the public's spare cash.

(2) To lend to those who are actively engaged in commerce and nation-building, such capital as they require; and

(3) To transfer cash from one person to another, from one city to another, and from one country to another, as economically as possible, and with the minimum risk.

This is business of a kind which the peoples of India can carry on successfully and with a maximum of advantage and profit to all concerned. The first thing to do is to persuade every Indian who hoards cash in his own house, to deposit it with some good shroff or bank who will give him a fair rate of interest for his money. In this way the owner of the cash will be relieved of anxiety and will receive a regular income from his hoard. The shroffs and banks who accumulate these deposits will be able to lend the money to all who can produce good security. In this way, India's growing trade and industries will be fructified with ample supplies of cheap capital that will, in its turn, enable those industries and trades to deal with the public, in and out of India, in good products at an economical cost.

Already splendid progress has been acheived. I give below a list of some *swadeshi* banks that are doing good work for India. Many of these banks are controlled by purely Indian brains, whilst some are conducted by a combination of Indian and English (or more probably, Scotch) partners:—

[Here follows a list of 46 banks.]

There are no doubt other banks whose business is confined solely to India, but whose names I have not been able so far to secure. The combined resources of all these banks,—from capital, reserves, and deposits, must be very great. And more banks are coming into existence in India every year. Such developments can only have the happiest results; for whilst the necessity for hoarding will grow less year by year, India's resources in the way of cheap capital will become year by year correspondingly greater.

THE PROPOSED STATE BANK.

One word of warning is perhaps, here advisable. With the raising of India's currency system to the level of that of Great Britain and of all the other leading nations in the world, *i.e.* Open, Free Gold Mints and a full value gold currency, and with the reformation of the India Office's present erratic methods of managing India's finances, both of which developments are now well in sight, a suggestion has been put forward from London—the home of the Empire's Bankers,—that a new Indian State Bank should now be created that would absorb (or amalgamate) the three Presidency Banks, manage India's gold reserves and Paper Currency, and afford to the Indian people greater facilities than they at present enjoy by means of the new Banks combined and enlarged capital. This proposed

State Bank, it is suggested, should have a branch (or its headquarter?) in London. In connection with this proposal it is only necessary to point out two things. Firstly, the Presidency Banks are very well able to manage their own business without State guidance, or assistance from outside; and secondly, the Government of India are also very well able to manage their Gold Reserves, their Paper Currency and their Paper Currency Reserve without assistance from London or any where else. Indeed, the only serious irregularities that have occurred with these Reserves have been perpetrated by the India Office presumably under the advice of interested London bankers. All which being so an Indian State Bank with a possibility of the strings being pulled from London is not wanted in India's interests; nor is it in the least likely to find favour with any section of well-informed banking or financial opinion in this country.

What India now wants is *not* more banks *with head quarters in London*, but more *Indian* banks created *in India* by *Indians* and bringing into use some of that *Indian money* which is at present lying hidden away in the country in unproductive hoards. Such swadeshi banks would accustom the public to the use of the best forms of metallic and paper money, and would at the same time, be able to afford to Indian trade those supplies of cheap capital without which India's advance must of necessity be considerably handicapped.

Indian Currency.

In a recent number of "*The County and Westminster Magazine*," the staff journal of the London County and Westminster Bank, there appears a very interesting article on Indian Currency, by Mr. F. J. Barthorpe, the Manager of the Lombard street office of that bank. The principal object of the article is to explain the Indian Currency system to those of the bank's staff who wish to follow the discussions which have already taken place on this subject and which are certain to arise in the near future owing to the appointment of a Royal Commission to inquire into the question', but while he devotes a good deal of his space to explanations and examples of the working of the system, Mr. Barthorpe also expresses some opinions. After explaining the failure of the system of unrestricted coinage of rupees and illustrating the working of the paper currency and gold standard reserves, the writer continues :—" The paper currency reserve, then, is our first line of defence; the pressure, however, caused at times by abnormal trade demands made it dangerous to rely entirely on this reserve for the necessary supply of rupees, and furthermore, in times of adverse trade, it was essential to make provision for the withdrawal from circulation of any redundancy of rupees, and so prevent a dilution of the currency. To meet these and other contingencies it became necessary to create our second line of defence—namely, the gold standard reserve. In order to secure a fixed exchange it was absolutely necessary to make effective two essentials—namely, that importers of gold should be able not only to demand in exchange for gold a certain number of rupees, but that conversely for a given number of rupees, anyone should be able to obtain the equivalent in gold. Therefore, to provide a substantial gold backing to silver, as well as to perform the other functions referred to in this paper a reserve under the above title was called into existence.

"Much has been said, and more remains to be said, upon the question of the currency reserves of India; whether too much of the gold standard reserve is held in England and too little in India, or whether its invested funds are put out to the best advantage, may be debatable questions, but the suggestion of some of the critics that all the reserves should be kept in India will not bear discussion, for we must not forget that the great object in view is maintaining the equilibrium of exchange, and this is facilitated by keeping a fund in England on which India can draw and a fund in India on which England can draw in case of need. It provides also a convenient means for financing the requisite purchases of silver. Stability is the alpha and omega of this currency policy, and it is just as important to prevent exchange rising to gold export point as it is to prevent it falling to gold import point. To achieve this, we rely with confidence upon our first and second lines of defence. It is through the paper currency reserve that we get the first intimation of a coming storm, and it is with the assistance of the gold standard reserve that we are prepared to meet the storm when it arrives. The previous system with its free coinage of silver proved a failure but the present one has, notwithstanding various adverse circumstances which would have exposed the weakness of any system less stable, risen to every occasion and converted such adverse forces into silent witnesses of its strength and superiority. In the words of an Indian banker : 'It is difficult to conceive a more perfect or more automatic system, one which contracts and expands exactly according to the requirements of the community.'"

The Educational World.

Book Keeping and Joint Stock Enterprise

THE Hon'ble Mr. J.H. Stone of the Madras Educational Service recently gave one very satisfactory explanation of the difficulty experienced in inducing Indians to join together in joint stock enterprise. He suggested that it may be that people not being aware of the possibility of keeping complicated business matters perfectly well regulated by a proper system of accounts, may hesitate to embark money in such enterprises. And, therefore, the spread of knowledge of such comparatively simple matters as account-keeping may very likely be an important item in furthering the development of joint stock enterprise.

Literacy in India.

According to the census statistics of 1911, there were in all India $18\frac{1}{2}$ million literates, of whom $1\frac{1}{2}$ millions only were literate in English. Roughly, therefore, there were 12 literates in the vernacular to 1 literate in English. Ten years ago, *i.e.*, according to the census of 1901, there were $15\frac{1}{2}$ millions who were literate, of whom 1·12 million only were literate in English. Thus, roughly 1 in 14 only were literate in English. On the whole, there is an increase in the proportion of those literate in English, which is probably due to the fact that greater attention is paid to English teaching institutions which are more popular. Coming to the provincial details, we find that among men only 1 in 9 was literate in English in Bengal, 1 in 7 in Bombay, 1 in 11 in Madras, 1 in 7 in Punjab, and 1 in 11 in U. P. In all the provinces we find the proportion has increased. But in the case of women, the proportion has fallen from 1 in 9 in 1901 to 1 in 10 in 1911. Thus we find the proportion of women, literate in English, was 1 in 7 in Bengal, 1 in 6 in Bombay (as against 1 in 5 in 1901), 1 in 10 in Madras (as against 1 in 8 in 1901), 1 in 6 in Punjab (as against 1 in 5 in 1901), and 1 in 8 in U. P. (as against 1 in 5). Whether this is due to inadequate provision made for the teaching of English for girls in schools or to a disinclination of girls themselves for learning English, must be ascertained.

Technical Education.

The Victoria Jubilee Technical Institute will hereafter be constituted a central institute of technology for the Bombay presidency; and the methods and standards of the minor institutions will be so systematised and co-ordinated that the students may by natural transition pass from the inferior schools to the central institute. A committee of direction for technical education has been appointed, and that committee will regulate the courses and standards of instruction ; arrange for the periodical inspection of the schools and examination of the classes ; cause translations to be made into vernaculars of text-books on technical subjects; and advise Government on the aid to be given to schools. All these activities will cost money and provision has been made for the expenditure. The scheme that is published does not provide for the immediate establishment of more schools in the presidency. It is left to the committee of direction to recommend to Government where new schools and classes may be opened. The central institute itself will be extended and removed to a different building. The institute has hitherto been receiving an annual grant of Rs. 45,000 from Government; this amount will be increased to a lakh. The total cost of the removal is estimated at more than 12 lakhs and a half, out of which ten lakhs may be covered by the sale-proceeds of the existing premises. The site proposed for the new building is about half a mile from the Matunga station on the G. I. P. Railway and within easy reach of the industrial centres of Bombay.

Continuation Schools in Germany.

From a "Report on Eight Years of Technical Education and Continuation Schools" presented to the Education Committee of the London County Council, we learn that the distinctive feature of the continuation-school system in Germany is the recognition of the principle of compulsory attendance. This is enunciated in the Imperial Labour Law of 1891, which imposes the statutory obligation on all employers of labour to give their employees under eighteen years of age such leave of absence from work for the purpose of attending continuation schools as the local authority may prescribe. It also gives to the local authorities the power to make by-laws requiring compulsory attendance at continuation schools. The law was amended in 1900, when employees under eighteen were defined as male workers, female clerks, and female apprentices. A decree of 1904, issued by the Minister of Industry and Commerce, enjoins that such compulsory classes should be held during the working-day and not in the evening or on Sundays.

The compulsory continuation system for boys has now been generally, though not universally, adopted throughout the German Empire. A notable exception is Hamburg, where a voluntary system, worked through the guilds, still remains. Each State has been free to adopt and develop its own system of compulsory school, and considerable variety as to hours and other details of organisation exists. In most urban centres, the survival of the guild system with its educational tradition has greatly facilitated the development of the continuation schools, and has rendered possible a highly differentiated system of trade courses.

The most striking example of this is offered by Munich, where, under the guidance of Dr. Kerschensteiner, a complete system of compulsory technical schools offers specially arranged courses of instruction for every type of trade pursued in the town by male workers.

The development of the continuation-school ystem has been mainly in relation to boys. Comparatively little progress has been made with regard to girls.

Education in Printing.

The Mysore Government has of late years shown an exemplary zeal in devising measures for the amelioration of the agriculture, commerce and industry in the State. Great attention is being devoted to technical and industrial education and the existing schools are being reorganised to meet the growing needs of the times. The condition of the important industries in the State is being examined with a view to see how far they could be improved. Thus the condition of the private printing industry in Mysore has, for some time past, been engaging the attention of His Highness' Government. The increase of the number of printing presses in Mysore from 11 in 1885-86 to 52 in 1911-12 shows that there is a large opening for those who wish to take up printing as a profession. With a view to afford facilities for those who are desirous of improving their knowledge of the art of printing and also of the management of presses, the following arrangements will be carried out if applications are received for such help. The Superintendent, Government Press, will inspect any private press that welcomes his assistance and offer such suggestions to the proprietor thereof as he deems fit in order to improve the stock of type, the methods of management, the system of account-keeping and other subsidiary matters connected with its general efficiency. If necessary, he will put private presses in direct communciation with the European market in the matter of purchasing type and other materials required by them. Generally he will tender advice in all matters concerning the management of private presses to the proprietors thereof. Further, with a view to encourage the spread of the knowledge of the printing art in the State and to provide an adequate supply of trained labour to the several private printing presses, Government have decided to open a printing class at Bangalore in the Commercial

School to be started from 1st July next. To begin with, the instruction that is to be imparted therein will be free and elementary in character. Arrangements will be made to hold a day printing class, the hours of attendence being so regulated as to be most convenient for the class of pupils that seek admission to it. If, however, day class is found unsuitable or inconvenient, evening classes may be arranged for. The Government will also be prepared to consider the question of providing for higher instruction and training in the several branches of the art of typography, if the results of the scheme now sanctioned satisfy them that improved knowledge and skill in this industry will be appreciated and utilized by the public.

Farm Schools in England.

The Board of Agriculture has issued to the local Education Authorities in England, a circular stating that they are prepared to make grants from money placed at their disposal by the Treasury from the Development Fund for the purpose of extending and systematising agricultural education. The grants will be in the form of contributions towards the expenses of Advisory Councils which it is proposed to set up; towards providing and maintaining buildings and land for farm schools and farm institutes ; and annual contributions towards new and additional work in connection with such schools and institutes. The Board will invite local Education Authorities and the governing bodies for centres for higher agricultural education to form advisory councils in such areas as may be decided on, and to nominate representatives thereon. The Board will also nominate members. The Council will be asked :—

(*a*) To consider the needs of the area as a whole in regard to Agricultural Education, and the schemes prepared in respect of the several counties or groups of counties, and to advise the Local Education Authorities thereon, with a view to maintaining a close connection between schemes for providing Agricultural Education in the counties and the work of the approved centre or centres for higher agricultural instruction in the area.

(*b*) To advise on the co-ordination of the provision of technical advice for farmers, both through the medium of the centre for Higher Agricultural Education and through the agricultural staffs of the counties.

(*c*) To assist in preparing schemes of agricultural experiments and demonstrations, to be carried out jointly by the counties within the area.

(*d*) To assist Local Education Authorities in obtaining such part-time instructors as they may require to enable such instructors to be wholly and exclusively employed within the province.

(*e*) To advise Local Education Authorities as to the need for further Farm Schools and Institutes as centres for Agricultural Education of a less advanced type than that provided at the Centre for Higher Education.

(*f*) To report to the Board on the state of Agricultural Education in the area or province, with special reference to the above points.

It is pointed out that in order to gain the confidence of the farming classes the Agricultural Education Committee should include a sufficient number of local agriculturists or other persons directly interested in agriculture and its allied industries, and that the Committee should appoint to act as organiser of the work a special officer, who will give instruction in one or other branches of the subject. Each county or group of counties applying for a grant should prepare a scheme providing for the systematic organisation of agricultural education in the area, and for its connection with a farm school as the head-quarters of the itinerant instructors employed.

Publication Work of the U. S. Department of Agriculture.

The records of the Division of Publications, in which the publication work is centralized, show that in 1897 the mail requests for publications barely exceeded 500 letters per week, while in 1912, the weekly mail has exceeded

52,000 letters, or more than 100 letters for each one received at the earlier date.

With a printing fund of $116,888, the different publications printed in 1897 were 424, and the editions aggregated 6,541,210 copies; in 1912, with an appropriation of $470,000, the different publications were 2,110, aggregating 34,678,557 copies.

The work of the Division of Publications reflects, and it is assumed must always represent, the activity of the other offices of the department. All the information acquired in the several bureaus by the means at their command finds its expression necessarily in the form of publications which pass through this office. Every enlargement of the scope of the work covered by any other office, especially the adoption of entirely new lines of work, involves an addition to the work of the Division of Publications.

The appropriations for the fiscal year 1897 disbursed by this division for salaries, supplies etc. amounted to $44,367, while for 1912, they were $209,960, an increase of nearly 475 per cent. In 1897, the number of employes in the division was 61, and in 1912 aggregated 197, an increase of nearly 225 per cent.

During the 1897-1912 period, over 225,000,000 copies of publications have been distributed to those engaged or interested in farming. Of this number slightly more than 88,000,000 copies were Farmers' Bulletins. Although the series of Farmers' Bulletins was begun in 1889, only about 5,000,000 copies had been issued by 1897, and those distributed during that year amounted to less than 2,000,000 copies, while during the year 1912, over 10,000,000 copies were distributed. Previous to the period under discussion, only 41 different Farmers' Bulletins had been prepared, and at present there are 506 separate pamphlets discussing nearly every phase of modern agricultural operations.

It is stated that no other Government issues as many publications as does the United States and that no executive department of the U. S. Government issues as many publications as does the U.S. Department of Agriculture in performing its function of acquiring and disseminating useful information in regard to agriculture. But the rapid increase in the population of the country and the great popularity acquired by the documents of the U. S. Department of Agriculture have so augmented the demand that the department has not in recent years had an appropriation that permitted the printing of a sufficient number of copies to meet the demand.

The U. S. Congress, however, has provided a solution of the problem by authorizing the Superintendent of public documents to reprint and sell at a nominal price such documents as may be required. The enormous increase in the sale, by that official, of the U.S. Department of Agriculture publications is surprising when it is remembered that millions of copies are distributed free, both by the Department of Agriculture and by Members of Congress. During the last fiscal year 171,866 copies were sold by the Superintendent of public documents, for which he received $16,428.

The magnitude of the work of disseminating the vast fund of information so systematically sought and so scientifically verified is commensurate with the enormous advance made in the application of scientific knowledge to practical agriculture in the United States—a result to which the U. S. Department of Agriculture has contributed no small share. The improved conditions on farms, the increased yields of crops, the improved breeds of live stock, and the new varieties of fruits resulting from the labors of the U. S Department of Agriculture as detailed and explained in its publications have added many millions to the wealth of the American Nation.

Manual Training.

The following Bombay Government Resolution regarding manual training at Training Institutions and High Schools, has been published —

On the 14th May, 1912, the Government, after reviewing the position made in the codes of the various Training Colleges for imparting

manual training, remarked that *prima facie* there was a case for the extension of facilities for manual training at the other Colleges on the lines of the course laid down at the Dharwar College and expressed the opinion that, if a complete course leading up to the issue of teaching certificates could be arranged at these Colleges, there would ensure a corresponding multiplication of manual training classes in connection with the larger primary schools, and a general impetus would be given to the spread of this form of instruction. It was added that Government considered it desirable that means should be devised for correlating (though not necessarily rendering uniform) the methods and objects pursued in imparting manual instruction in the several schools. The Director of Public Instruction was accordingly requested to submit, after consulting the Principal of the Victoria Jubilee Technical Institute, a report on the possibility of taking action on the above lines. Subsequently, at the instance of the Hon'ble Rao Bahadur Shriniwas Konher Rodda, the Director of Public Instruction was asked to report whether he considered it desirable and practicable to establish manual training classes at Bijapur and other Government High Schools, and if so, to submit detailed proposals together with an estimate of the cost. In September, 1912, the Government of India, while forwarding the Report of the Committee appointed by them to inquire into the question of bringing technical institutions into closer contact with employers of labour, emphasised the need of making education in Primary and Secondary schools more practical, and the Director of Public Instruction was asked to report on this point. The several reports called for have now been received, and the Governor in Council is pleased to issue the following orders on them.

With regard to manual training in Training Colleges the conclusions arrived at by the Director are :—

(*a*) that it is both desirable and practicable to institute a manual training class at each of the Training Colleges for men ; (*b*) that the subjects should be compulsory in the first year and optional during the rest of the course, when it should form an alternative with such subjects as agriculture and drawing ; (*c*) that the course should be based upon the system known as "Sloyd," the ultimate object being to attach wood-work classes to Primary schools, not for industrial purposes but for the betterment of general education.

As regards Secondary schools, manual training, consisting of drawing and practical carpentry, is prescribed as an optional subject for the School Final Examination, and under Rule 25 of the Grant-in-Aid Code the subject is included among the optional subjects, one of which at least is required to be taught in the middle stage and two in the higher stage, of the curriculum of Anglo-Vernacular Schools. The only Government Secondary School where provision for any kind of manual training at present exists is the Belgaum High School, and the Director of Public Instruction considers that a beginning might be made by the institution of manual training classes at Satara, Dhulia, Sholapur, Bijapur, Ahmedabad and at a centre in Sind. These conclusions of the Director are accepted subject to the remarks made below.

"Sloyd" System Advocated.

The Governor in Council is of opinion that the manual training to be given in the Training Colleges and High Schools should not be of the kind which is now being given at the Dharwar Training College and the Belgaum High School, but that the system of handwork known as "Sloyd," which possesses educational advantages not associated with the ordinary forms of manual training, should be adopted. For this purpose it will first be necessary to establish a special class at which instruction will be given to—(*a*) persons who will become teachers of Sloyd in the High Schools at which classes in that subject will in due course be established ; (*b*) persons who will teach Sloyd at the Vernacular Training Colleges where henceforth every student will have to undergo a Sloyd course in his first year, it being thereafter optional for him to

continue this subject or to take up drawing or nature study.

The Director of Public Instruction should accordingly be requested to enquire and report on what terms a competent teacher of Sloyd can be obtained from Mysore, where the system has been successfully taught for some time and to submit definite proposals for opening a special Sloyd class at Dharwar together with an estimate of the cost involved. He should also be asked to report what the cost (both recurring and non-recurring) would be of introducting the system in each Government High School and Training College. From the Government of India's recurring and non-recurring grants, allotments of Rs. 15,000 recurring and Rs. 1,00,000 non-recurring, have been made for manual instruction.

As agriculture has been omitted from the curriculum of Primary schools under the orders contained in paragraph 7 of Government Resolution No. 1402, dated the 5th June, 1912, there is no need to continue it as a compulsory subject in the first year, or as an optional subject in the second and third years of the Training College course, and the Director of Public Instruction should be asked to submit definite proposals for the teaching of such subjects as advanced drawing, clay-modelling, nature-study and school-gardening as subjects alternative to manual training in the second and third years of the course.

For the present, manual training on the lines above indicated will be introduced in such Government schools only as possess the requisite facilities, and it must, therefore, continue to be an optional subject but in any Government Secondary school where provision for imparting manual training exists all pupils up to and including the fifth standard will be required to take it up.

Morison Committee Report.

The report of the committee appointed by the Secretary of State for India to enquire into the facilities available for Indian students for industrial and technological training in the United Kingdom, with special reference to the system of state technical scholarships established by the Government of India in 1904 contains, with appendices, 169 pages. The Committee were appointed on March 27, 1912. The chairman of the Committee was Sir Theodore Morison and the other members were Sir K. G. Gupta, Mr. J. H. Reynolds and Professor W. E. Dalby, with Mr. P. H Dumbell as secretary and Mr. R. E. Field as assistant secretary. The Committee held their first meeting at the India Office on May 9, 1912. The first industrial centre visited was Glasgow, where they examined 21 witness, among whom five were Indian students. The witnesses included Sir Donald MacAlister, vice-chancellor of the Glasgow university, representatives of the industries of civil engineeing and mechanics, metallurgical chemistry, electrical engineering and mining, and the chairman of the board of governors of the Royal Technical College. The Committee next visited Leeds, where 23 witnesses, including 5 Indian students, were examined. Among the witnesses were representatives of organic chemistry, tinctorial chemistry and dyeing, textiles and leather. Next, 25 witnesses were examined at Manchester, including 5 Indian students. Among the witnesses were Sir Thomas Holland, director of the department of geology and mining, Victoria University of Manchester; the principal of the Municipal School of Technology; Sir William Mather and representatives of inorganic chemistry, physics, textile manufacture, aniline colour manufacture, sanitary engineering, bleaching, printing and finishing, paper manufacture, and textile machinery. At Birmingham only three witnesses were examined, but a conference was held with some of the leading manufacturers of the district, at which representatives of hardware, heavy metal manufacture, weight and scale manufacture, cocoa, and commerce were present. In the new mining laboratories of the university is a miniature mine which has been constructed for the use of mining students. Altogether during the provincial meetings, the Committee took

evidence from 75 witnesses, of whom 29 were professors and other representatives of the universities and technical colleges, 28 gentlemen intimately connected with various industries as owners and managers of works, etc., and 18 Indian technical students. The Committee examined 10 witnesses in London, among them being the Government director of Indian Railways, Sir R. N. Mukerji, Sir D. J. Tata, Sir D. M. Hamilton, Mr. Ambalal Sarabhai (a mill-owner of Ahmedabad), Dr. Morris Travers (director of the Indian Institute of Science, Bangalore), His Majesty's chief inspector of mines, the Superintendent of industries in Bengal, and Lieut. Colonel Clibborn, late Principal of the Roorkee College. The committee consider that they have by no means made an exhaustive survey of the facilities available for technical instruction in the United Kingdom, but it was impossible for them to extend the tour. They however obtained sufficient information to prepare a report 'which will indicate the main lines of the policy which in our opinion should be followed hereafter.' They however recommend that some representative of the Secretary of State should visit such centres as Sheffield, Liverpool, Bradford and Newcastle, where, from evidence given before them, it appears probable that special facilities exist for the study of particular subjects.

The Committee in their report give the history of the technical scholarship system, and review its working.

SCHOLARSHIP SYSTEM

The chief object of the State Technical Scholarship system is to provide higher technical education which will qualify the holders on returning to India to assist in promoting the improvement of existing native industries and the development of new industries wherever possible. Up to March 31, 1912, sixty-six men had been granted these scholarships, including twenty-four for textile industries, nineteen for mining and mining engineering, seven for electrical and mechanibal engineering, five for the leather industry, and three for metallurgy. Apart from the holders of these scholarships, there has been a marked influx of Indian students in the last few years in centres of technical instruction in England—some coming at their own expense and others brought by agencies established in India to encourage such studies.

INDIAN STUDENTS AND UNIVERSITEIS.

The first broad conclusion of the committee is that Indian students generally get on well at the universities and technological schools where they pursue their industrial education. They are quite up to the average capacity of their classes, provided they come to this country with a fair grounding, but those who have passed only the intermediate examination on the arts side or the matriculation of an Indian university are unable to take full advantage of the instruction given. Those who have had practical experience of the industry are able to derive great benefit from the teaching given; but those who, like most of the mining students hitherto sent, have had no previous acquaintance with the industry they propose to follow, do very badly, and the money spent upon their education has, for the most part been thrown away. Indian students of engineering are handicapped by their general ignorance of machinery and the inadequacy of the training in drawing they have received in India.

RECOMMENDATIONS.

The first recommendation in respect to the selection of scholars is that they should ordinarily have read in India up to the standard of the B. Sc, or B.A, with science or have obtained an equivalent diploma. The second is that wherever possible they should have had preliminary practical experience. In mining, this condition in the future must be strictly enforced, and no student must be sent to England unless he has had at least a year's experience down an Indian mine. Emphasis is laid on the advantage of elasticity in the system of selection; and it is urged that the local Government should proceed on the principle of choosing the man rather than the industry and that scholarships should be awarded after consultation with business men and employers' associations in India. A most important proposal is that practical training in a business firm should be considered an integral part of the course in this country and consequently that the period for which the scholarship is tenable should be extended so as to cover the time spent in undergoing such training. It is held that the period of tenure should range between three and five years.

PRACTICAL TRAINING.

Discussing the methods of securing practical training in this country, the committee urge the need for a thoroughly organized system, and propose that it should be the duty of a special officer or department of the India Office to

invite the assistance of British employers. A list of firms willing on patriotic grounds to co operate with the India Office should be prepared and kept up to date ; but if sufficient facilities cannot be thus attained, it may prove possible to exercise influence through the Stores Department after contracts have been given.

INDIA OFFICE RULES.

The rules laid down by the India Office for the guidance of the scholars are held to stand in need of revision. A new set of rules should provide for strict enforcement of obedience to the India Office, and to employers and foremen during works training. Failure to give satisfaction to the emyloyer should expose the student to forfeiture of his scholarship. In view of some cases of deliberate failure to return to India after completion of training, it is recommended that all technical scholars should execute a bond undertaking to pay the value of their scholarships if they do not return to India within three years after its expiration. Measures for assisting returned scholars to secure employment are suggested, and it is proposed that records should be kept of their after careers and regular reports be sent to the India Office.

GENERAL CONCLUSION

The general conclusion of the Committee is stated as follows:—

The results attained so far justify the continuation of the system of Government technical scholarships, and, with the modification which we have suggested, the system may be expected to yield even better results in the future; but this expensive form of training at public cost should only be given to a well-chosen few who may reasonably be expected to help the industrial development of India. We recognise that the openings for such men are not at present numerous, and that the most urgent demand of Indian industry at present is for skilled mechanics, and we are in complete sympathy with the efforts now being made for giving in India a better training to men of that class. But the necessity for educating the artisan does not preclude the desirability of having a limited number of men with the highest technological training, capable of holding posts of control. Both classes are needed for the development of Indian industry, and opportunities for the improvement of both should be given simultaneously.

PARTICULAR INDUSTRIES

The general conclusions are followed by recommendations regarding particular industries, constituting the longest section of the report. The first place is given to engineering in its various branches namely mechanical, electrical, civil including sanitary and municipal engineering. It is proposed that the training should follow the approved practice of the profession in the United Kingdom as laid down in the well-known 1906 report of the committee of the institution of Civil Engineers. It is recommended that all Indian engineering students of whatever branch should receive a year's preliminary workshop course in a mechanical engineer's shop in India ; that those who come here for their college course should have received in India a training in mathematics, physics, chemistry, and engineering, drawing of a sufficiently advanced character to join a second year class at once ; and that special instruction in mechanical drawing and descriptive geometry should be given in India. In mechanical and electrical engineering there should be a system of apprenticeship which allows the apprentice to take a college course. In civil engineering opportunities for practical training should be sought in India rather than in the United Knigdom ; and it is suggested that perhaps greater facilities might be provided by the Government of India, and that in particular, engineers in the Public Works Department might be allowed to take premium-paying pupils. Other industries dealt with are mining, geology, metallurgy, textile industries including spinning and weaving, bleaching and finishing and dyeing ; tanning, and chemical manufactures

As appendices are published (1) selection of correspondence between the Secretary and the Government of India; (2) extracts from the fifth quinquennial review of the progress of education in India, 1902-07; (3) statement showing subjects of study of Government technical scholars and institutions attended; (4) statement of expenditure ; (5) statement relating to Government of India technical scholars, 1904-12; (6) extract from the 1912 report of the Association for the Advancement of Scientific and Industrial Education of Indians; (7) written evidence submitted to the Committe by Professor J. Cadman, D. SC., and Sir T.H. Holland, K.C.I.E., F.R.S. ; (8) list of reports and papers laid before the Committee; (9) 'The Training of Engineers in the United States, a paper read before the Institution of Naval Architects, in 1903, by Professor W. E. Dalby M. A., B.SC., with discussion thereon, and (10) synopsis of commitee's conclusions and recommendations.

INSURANCE.

Good Insurance Companies.

There are some well recognised rules to which all good insurance companies should conform. Briefly we may summarize the most important of these rules as :—

(1) The fixing of rates adequate to the risk to be covered.

(2) The careful selection of the risks themselves (which, of course, includes proper medical examination and proper allocation of various loadings to various extra-normal risks.)

(3) The strictest economy compatible with obtaining sufficient new business to feed the company.

(4) The wise investment of surplus funds to secure (*a*) a good rate of interest (*b*) the security of the capital.

It these conditions are satisfied, then as Professor DeMorgan, one of the greatest authorities on Finance, says :—"There is nothing in the commercial world which approaches even remotely the security of a well-established Life Office." Indeed, well-managed concerns and even Banks may fail, but well-managed Life Offices never fail; well-established Life Offices can stop their business at any moment, and yet fulfil their contracts with unfailing regularity. This, in fact, is the best test of the soundness of an Insurance Company.

Profits of Insurance Companies.

The records compiled from the Blue-Books containing the annual returns of life offices show that the rate of interest earned on the assurance funds fell steadily over a long series of years, until it eventually reached low-water mark in 1904, when it stood at £3 12*s.* per cent. Since then it has steadily risen, until in 1911 it reached £3 17*s.* 3*d.* per cent., and there is every reason to anticipate that the upward movement will continue.

What this really means to policy-holders may be, perhaps, better comprehended when it is considered that this extra ¼ per cent. on the funds relating to the "ordinary" business (as distinguished from industrial) of life companies transacting business in the United Kingdom represents a clear £1,000,000 sterling more per annum than would have been the case if the conditions that obtained in 1904 still existed. The results obtained by individual companies will, of course, vary in a greater or less degree from the average rate previously quoted.

Theft Insurance.

When people lock up their houses and go out, the burglary business commences, and there will be those who will doubtless have cause for regretting, that they have not taken the wise precaution of having their goods and chattels insured. Burglary insurance is much more common than it was, but many people, even of those who are insured against the risk, have no very clear idea about the extent of their protection. The British rate of eighteen pence, or annas, for every £100 is so strikingly small a premium that the average agent opens his campaign by stating that figure and too often the order is given on that basis. It should be clearly kept in view that the distinguishing mark of burglary and house breaking is "forcible entry" by night or by day, so that mere theft does not come within the four corners of the policy. The umbrella, the golf clubs, the fur-lined coat, gracefully removed from the vestibule through the open door are gone, with no "claim" to sweeten the loss. The acquisitive housemaid, the tempted gasman, the sharp-fingered gentlemen who comes to the house as the cook's cousin may "convey" what they wish or what they can, but if no lock is picked or window unsnibbed or door burst open, the owner of the vanished good has just to grin and bear it. To keep him right, the policy should always cover "larceny" including theft by servants or by their collusion or by persons who are in the house for a legitimate purpose. The additional premium is only eight pence per £100, and it is poor economy to save it. This is an English rate, of course, but says a writer in *Commerce*, similar facilities for insurance are offered by many companies in India.

MACHINERY, SCIENCE AND INVENTION.

Fire Proofing Cotton.

A new process for fire-proofing cotton fabrics has been discovered. The method consists in dipping the fabric into a solution of salt containing tin and then into a solution of of ammonium sulphate. Great claims are made for the new method, and it will be watched very closely within the next few months.

Metallic Sponges.

A Danish scientist, M. Hannover, has invented a metallic sponge, which has recently come into industrial use. It is composed of an alloy of lead and antimony, and consists of a loose-meshed network inclosing spaces of larger or smaller size. It is employed for absorbing resins, oils, etc.

Artificial Diamonds.

Artificial rubies have already become well-known and now a Paris engineer claims to have produced minute diamonds by an electric furnace process, the largest of the specimens measuring nearly one-tenth inch. Naturally the announcement of such an important discovery has, remarks a contemporary, made somewhat of a sensation and gives rise to some incredulity as well, but the author has now published a brochure on the subject in which he gives a very complete account of his method, for which he has taken a patent. The specimens of artificial diamonds have been seen by some well-known scientists, also jewellers, and they identify them with real diamonds. Naturally they were put through all the necessary tests in this case. The process is based upon the electrolysis of calcium carbide in the electric furnace by the use of direct current, and the carbide is decomposed in such way that one of the poles be comes surrounded with a blackish and spongy substance in which a certain quantity ot minute carbon crystals or diamonds areobserved, and these are separated by pulverizing and washing the substance. The experiments were made on a small scale, as lack of means prevented further work, but the inventer expects to resume them soon. What is encouraging is that the size of the diamonds increases with the length of time the furnace is left running, so that there is reason to believe that much larger specimens can be obtained.

Electrical Tapping of Rubber.

Electricity gives the following particulars of an electrical invention for tapping rubber :—"It is reported that a German resident in Peru has devised an electrical system for the tapping of rubber trees and the coagulation of the latex. From particulars available, it appears that hollow iron channels, divided into series of sections, are placed on the trunk of the rubber tree. Within the sections are pricking devices which work independently so that different areas can be tapped at different times. Receptacles within the sections contain an acid preparation which coagulates the latex to rubber. Nine of these attachments, each containing 30 cups, may be fixed on a large tree, and after two months or so—during which time the tree need not be visited—there are 270 lumps of coagulated rubber waiting to be gathered. Important practical advantages are that the electric tapper can be operated before sunrise —at the time of maximum latex flow—and the small punctures made by the tappers avoid weakening of the trees by excessive bleeding. The exact arrangement of the tapping mechanism has not yet been explained, but the electrical energy required is distributed from a central station through insulated mains in the ordinary manner. The system appears to offer advantages both where wide collecting areas are operated and in cultivated rubber plantations. In the former case, the difficulty of controlling a large and scattered staff is avoided, and in the second case, the cost of the electric mains is reduced. In either case the capital and maintenance charges on the electrical equipment must be set against the cost and efficiency (as regards quantity and quality) of manual tapping and the damage caused by unskilful labour."

HINTS AND RECIPES.

Dim Lamps.

If your lamp burns dimly, or smokes, look at the wick. It may be dirty. Boil the burner in soda solution, wash the wick well and dry, or put in a new wick; use only good oil, and keep the chimney clean.

Driving Nails.

When nails are knocked into hard wood they often bend. To prevent this, dip each nail into a little sweet oil, or any kind of oil, before driving into the wood and they will not bend.

For the Preservation of Rubber Goods

Thal, in *Pharmazeutische Post*, recommends sheet-tin boxes, in which are placed shallow glass saucers containing solid carbonate of ammonia. By observations extending over a period of fifteen years, Thal has established that in such boxes, the rubber goods are not liable to deteriorate.

Cleaning Bone Articles.

To clean the bone handles of knives or any bone article, it is a good plan to use salt and lemon juice. First rub the article well with the lemon juice, then with the salt. This will remove all kinds of stains and grease spots.

Removing Finger Marks.

Fingermarks on doors and cupboards vanish when lightly rubbed with a piece of flannel dipped in paraffin. In order to do away with the odour of the oil, rub the door down with a clean flannel wrung out in hot water.

Removing Old Wall Paper.

A good way to remove old wall-paper is to use the following solution: A thick pasty solution should be made by adding flour and a few spoons of salt into boiling water. After this is made, add a few ounces of acetic acid, which may be purchased at any drug store. This pasty solution should be applied with a brush to the old wall-paper in quantities. After a few minutes, the old paper can be removed in] great strips very easily, and with very little dust or dirt.

Removing Stains from Tea Cups.

To remove tannin stains from tea cups or any other procelain ware, a pasty mixture of salt and strong acetic acid should be used. The mixture should be applied with a cloth, and after the stain is bleached out, the cups should be washed and dried.

Removing Iodine Stains.

To remove iodine stains from bacteriological instruments or the hands, a strong solution of hypo sulphite of soda is good and effective. The solution should be quite strong, and after its application, the solution should be rinsed off with warm water, and the stained article dried well.

To Keep Tin Goods Bright.

To keep sauce-pan lids and tin goods like silver, dip the article to be cleaned in boiling water, with soda in it, to remove all grease; then rinse with cold water and polish with a cabbage or with a rhubarb leaf, and rinse again with cold water. Do not wipe, but put the utensils before the fire to dry.

Preventing Oil Cloth from Cracking.

A good way to prevent oil cloth from cracking when used as covers for tables is as follows. A few thicknesses of paper are placed on the table and moistened thoroughly with machine oil. This will cause the oil cloth to last much longer, remain soft, and prevent cracking of the glazed surface. It should be stretched tightly over the oiled paper.

Test for Boiled Milk.

Sometimes dishonest milk-dealers boil their milk to take away the cream rising on the surface by sifting and decantation. Such milk can easily be distinguished from unboiled fresh milk. For raw milk treated with a weak solution of peroxide of hydrogen (2 per cent.) and two drops of a 2 per cent. solution of paraphenylenediamin and after being shaken with the mixture gives a dark violet colour, but no such colour appears in the case of boiled milk. In the case of a mixture of boiled and unboiled milk, the percentage of unboiled milk may be deduced by calorimetric methods as used in water analysis.

HEALTH AND HYGIENE.

Papaw Juice.

THE milky juice of the unripe fruit of the papaw is not only a valuable digestive but also an efficient vermifuge. The seeds also possess the same quality. The juice can be used for the removal of freckles.

Remedy for Prickly Heat.

DR. E. H. Hankin, Chemical Examiner, United Provinces, writes in the *Indian Medical Gazette* :—" I have been advised to publish an account of a remedy for prickly-heat which I have used for some years with success. Make a solution containing:—Water 997 parts, hydrochloric acid B. P. Fort, 2 parts, corrosive sublimate 1 part. Total 1,000 parts. The solution should be rubbed well in all over the affected parts twice a day, and allowed to dry on, if possible, under a punkah. If the skin is tender, the solution may be washed off with water a few minutes after application. This treatment usually gives relief in a few hours and cures the disease in a couple of days. The skin remains liable to fresh attacks. Hence it is advisable to apply the solution at intervals of a few days during the hot weather.''

Onions.

Onions, raw and cooked, are health-makers and anti-scorbutic. Eaten raw in a sandwich they are good for jarred nerves and induce sleep. If occasionally onions seem hard to digest, it is because they are improperly cooked. Change the water in which they are boiled three times and they should give no further trouble. Fried onions should be avoided. To very many people the many virtues of the onion are unknown. Lung and liver complaints are greatly benefited, often cured, by a free consumption of onions, either cooked or raw. Colds yield to them like magic. An extract drawn from onions by boiling down to a syrup and taken as a medicine is effective.

Deafness by Tea.

There is great danger in excessive tea drinking. Dr. A. Sharp reports the case of a woman, aged forty, who complained of increasing deafness for about eighteen months. On examination there was found difficulty in locating sound but no tinnitus (subjective noises in the ear) ; watch and whispered voice were heard about 6 inches from both ears; nose and throat were healthy ; ear drums were normal. Tuning fork tests were typical of nerve deafness. Family history was negative. Patient was subject to worry.

She found that strong tea cheered her up, and admitted taking it as often as eight or ten times a day. The tea drinking was stopped and in four weeks the hearing improved to 18 inches for watch and whispered voice. Improvement continued until the hearing was nearly normal. In spite of warning the patient again took to tea drinking and deafness resulted. On again giving up the habit, normal hearing returned.

Avoiding Eye-Strain.

Eye strain is said to be largely a defect of civilisation. To counteract it, children should be encouraged to use their eyes at long range, and older persons should so train themselves. A teacher who has a surprisingly small amount of eye-strain among her pupils attributes it to her practice of having the scholars drop their work at the end of each hour and look out of the window. There is a contest over who sees the farthest. This rests and trains the eyes, and teaches observation. A woman who does fine sewing for her living found her eyes strained and weak. She was advised to drop her sewing every half-hour and look for a minute into space. Relief was quick, and the eye-strain disappeared. Near-sighted persons who hold their book or work close will ease eye-strain and lengthen their vision if they frequently remove their glasses and look at some object on their farthest horizon. The long-distance training will not, however, relieve eye-strain that comes from astigmatism, reckless disregard of the eyes, or from glasses that do not suit the sight.